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UNDERPRICING AND THE LONG-TERM PERFORMANCE OF CHINESE INITIAL PUBLIC OFFERINGS

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ABSTRACT

The purpose of this study is to examine the level of initial returns and long-term performance of A-series initial public offerings in China's stock markets. The data used for this purpose cover 131 initial public offerings issued in either Shanghai (SHSE) or in Shenzhen (SHZE) stock exchange, during 2010–2012. This quantity of initial public offerings accounts for 12,04 % of all issued IPOs in research years.

Examination of initial returns is completed with market-adjusted returns, in order to find the development of underpricing phenomena. Market-adjusted buy-and-hold period returns and wealth relatives are used in researching the holding period returns of 6-, 12-, 24- and 36-month. Market-adjusted holding period returns are tested with Student's t-test in order to define their statistical significance. Regression analyses are used in testing the statistical significance and explanatory power of firm specific characteristics.

The empirical results of this study are unable to editorialize to the level of initial returns, as the results are in contradiction with previous studies. Instead, the results about the long-term performance of initial public offerings indicate them to be poor long-term investments, as those underperformed their benchmarks: SSE & SSH composite indices. Cross-sectional regression results indicate that there is a strong positive relationship between price-to-earnings ratio and long-term performance. Furthermore, a strong negative relationship between market-adjusted initial returns and long-term performance is documented in this empirical research.

Key Words: Initial public offering, Underpricing, Long-term Performance, China

1. INTRODUCTION

Initial public offering (IPO), is the first public equity issue done by a company. This issue takes place after company's decision to go public. The IPO allows the trading with the stocks of this specific company in the exchange where the stocks are quoted. Initial return is generally defined as the first day return, the difference between the offering price in the IPO and first day close-price. The initial return is the most common indicator for underpricing, although markets' overvaluation can affect high initial returns as well, consequently distorting the assessment of the underpricing. (Carter & Manaster 1990: 1045.)

The underpricing of initial public offerings is documented by an extensive literature around the globe. The most common method for defining the underpricing is to examine the initial returns: the difference between offer price and first day close price. As underpriced, the IPOs experience significant first day returns, i.e. strong positive initial returns. Commonly it has been a short-term phenomenon, however, the extent of this phenomenon is not unambiguous. In some circumstances, as in hot market conditions the underpricing might last months and the initial returns are much higher, whereas in other circumstances and environments the phenomenon might not exist. (Ritter 1991: 3–4.) As widely documented anomaly, there are multiple theories explaining this short-term underpricing, which can roughly be divided into four categories: theories based on asymmetric information, behavioral theories, institutional theories and last theories based on ownership, control and monitoring.

Another anomaly related to the initial public offerings is their poor long-term performance. IPOs have usually underperformed their benchmarks in the long-term, as the most common explanations for the underperformance are usually pseudo market timing (hot market conditions) and overoptimismn & fads. Due to the speculation and underpricing of IPOs, there is strong interest in the markets towards IPOs, as investors are interested in taking advantage of the short-term underpricing. On the other hand, issuing companies might be willing to take advantage of optimistic markets in order to raise maximal gross proceeds, by issuing their IPOs at certain time when markets are in upturn. As a result, the speculation and thus strong demand drives the prices even higher,

further away from their fundamental value. This short-term overvaluation lasts till investors in the market realize the companies are not as profitable as they thought, causing the prices to fall as the fads fade away. Consequently, the IPOs surrounded by speculation and fads have higher probability to face poor long-term performance, as multiple studies have revealed the high initial returns have a negative and significant relationship with long-term performance, creating a link between these two anomalies. (Ritter 1991: 3–6; Schultz 2003: 483–485.) An extensive empirical literature has also documented several other causalities regarding to IPOs, which will be presented further in this study.

Su & Fleisher (1999) were one of the first to examine the underpricing of Chinese A-series IPOs, and the average initial returns were 948,59 % during 1987–1995, as the maximum individual initial return was 38300 %. Throughout the years the level of initial returns has weakened, however still being strongly positive. Numerous studies conducted in China have also revealed that initial public offerings have been poor long-term investments (Chen, Firth & Kim 2000; Chan, Wang & Wei 2004; Su & Bangassa 2011). Hence, researching these two anomalies and their current states in China is interesting due to the unique markets and circumstances.

The history of Chinese IPOs started in mid-1980s, as the first initial public offering was issued as a part of an experimental joint stock system (Guo & Brooks 2008: 985). Nowadays, the IPO markets in China composes from two stock exchanges: Shanghai and Shenzhen, which were established in the early 1990s. The changes in the economic circumstances of China were substantial, as for the first time, companies had an alternative opportunity – raise capital from the markets. (Mok & Hui 1998: 454). As of then, the economy of China has been in significant upturn, by raising more than 8 % annually for the next 20 years when measured in GDP growth. Simultaneously it reflects the successful economic reform. (Wan & Yuce 2007: 367).

Nowadays, there exist two types shares subjected to trading in the Shanghai and Shenzhen exchanges, A-shares and B-shares. The A-shares are generally available only for domestic Chinese investors, however as of 2002 there has been an exception: qualified foreign institutional investors (QFII) have been allowed to participate to China's capital markets directly. Otherwise the stocks are exclusively for mainland Chinese. The other type of share, B-share, which was established in Shanghai stock exchange in 1992, is

exclusively for foreign investors and the shares are quoted in U.S. dollars. The purpose of establishing the B-shares was to attract foreign capital, investors, and transform the management of companies held by mostly foreign institutional investors. Due to the differences between A- and B-shares, the markets are segmented and regulations and restrictions regarding to shares are unequal. (Mok & Hui 1998: 453–474; Shenzhen Stock Exchange 2016.)

China has begun to play a key role in the global economy and its economy became the largest in Asia and the second largest in the entire world during the last decade, losing only to United States. Despite the rapid growth and importance in global economy, there still exist unique phenomena and circumstances are strongly different, distinguishing them from western financial markets. For instance, the regulatory environment is strongly in the hands of Chinese Securities Regulatory Commission (CSRC). During the past they have regulated the pricing, allocation, timing and other features of IPOs, as a result being an important stakeholder in IPO markets. One of the most important regulations has been the pricing of IPOs, till June 2009 the pricing had been based on different kind of equations, lastly in P/E ratio which was not allowed to exceed 15, afterwards all pricing regulations were deregulated. (Chan, Wang & Wei 2004; IMF 2015; Tian 2011: 78; Yu & Tse 2006: 381.) As showed further, the actions and regulations taken and set by CSRC have strongly affected to initial public offerings, strengthening the initial returns directly and indirectly.

During the recent years, China's economy has also experienced major afflictions. The indices soared exceptionally high since mid-2014 to June 2015, as most of the indices rose more than twice. However, the upturn changed to severe tailspin in summer 2015. All stock indices plunged intensely, causing the Central Bank of China to intervene markets and taking control over them. As a result, trading was ceased for over a month in parts of the exchanges, and in August 2015, Yuan Renminbi got devaluated twice.

The figure 1 exhibits the descriptive statistics regarding to the Shanghai and Shenzhen stock exchanges, by presenting the quantity of companies in exchanges, average P/E ratios and total market capitalization of stock exchanges. As the figures present, the recent years have affected to both of them and the differences between exchanges have increased, especially the difference between average P/E ratios became massive. Thus, differences between exchanges about the long-term performance might occur.

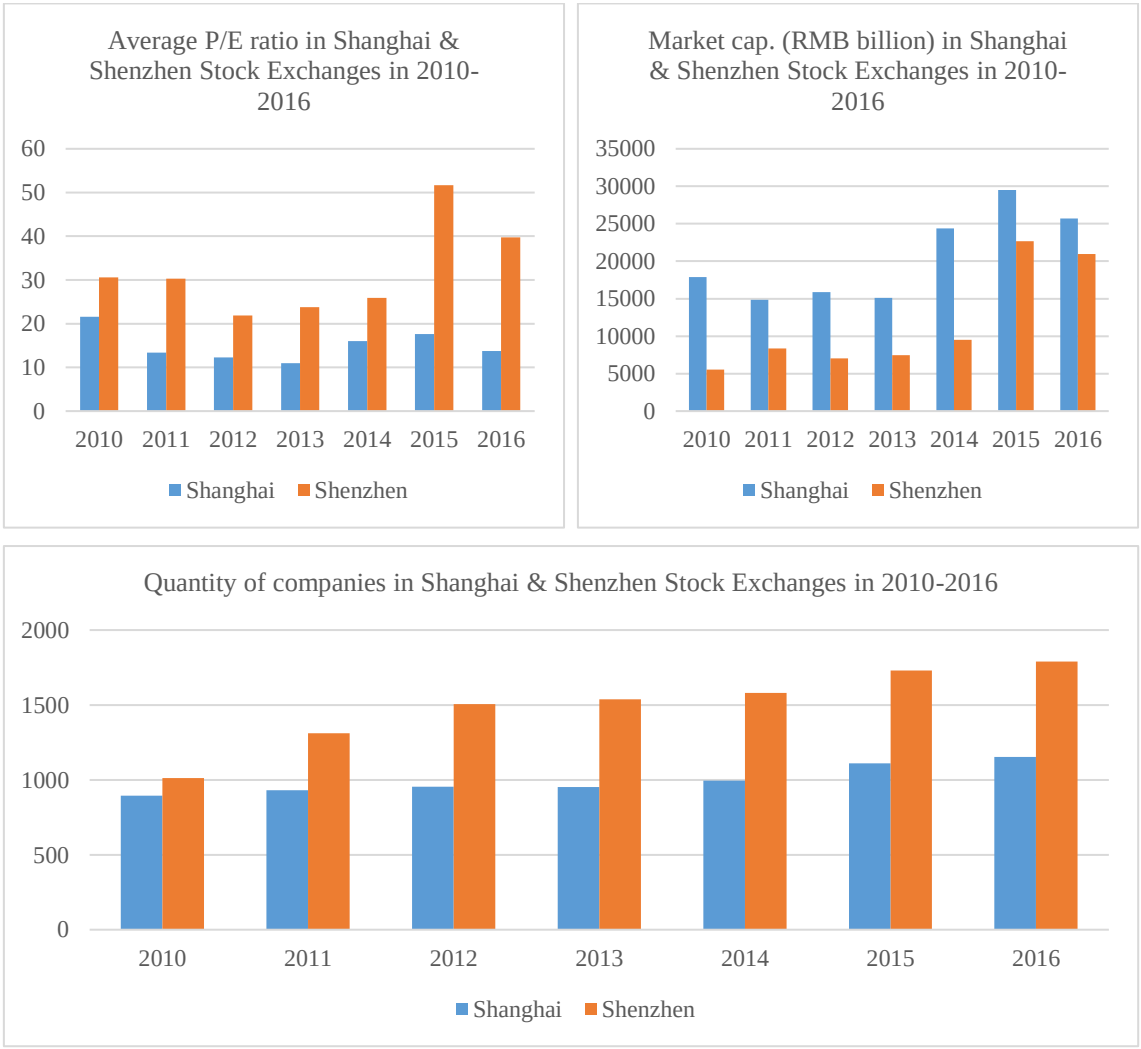

Figure 1.) Development of market capitalization, average P/E ratios and the quantity of companies in Shanghai & Shenzhen stock exchanges in 2010-2016. (Shanghai Stock Exchange 2016; Shenzhen Stock Exchange 2016; Siblis Research 2016.)

1.1. Purpose of the study and limitations

As briefly presented above, the average initial returns in China have been 948,59 % during 1987–1995, however substantially decreased by years 2006–2011, being approx. 66 %. Furthermore, pricing regulations regarding to the IPOs have stood till June 2009, when all rules around pricing were deregulated. The regulations related to pricing has increased the initial returns, as investors were aware that the initial returns were going to be sky high. Hence, there was a strong speculation related to IPOs in the first trading days, driving the prices up. After the deregulation one could assume the IPOs to be priced more reasonably by underwriters and thereby the fads and overoptimismn to weaken. Throughout the history, Chinese initial returns have also been bothered by poor long-term performance. High initial returns have usually indicated about worse long-term performance in global stock markets, and this is also documented in the latest studies from China. Consequently, the purpose of this study is to offer recent information and view of the development of these phenomena and their relationships during 2010–2012, right after the deregulation of pricing ceilings. This study focuses especially on the firm specific characteristics at the time of the issuance, if those are able to explain the long-term performance.

Research problem for this study is following:

"Does the underpricing still exist in Chinese IPO markets? Does the anomaly of poor long-term performance exist among Chinese IPO markets after the deregulation of P/E ratio based IPO pricing, and can the poor long-term performance be explained with firm specific characteristics?"

Hypotheses for this empirical research are followings;

H1: *"Initial public offerings have been statistically significantly underpriced in China during 2010-2012"*

H2: *"Underpricing has weakened significantly during the research period"*

H3 *"Chinese IPOs are poor long-term investments"*

H4: "*There is a statistically significant negative relationship between market-adjusted initial returns and long-term performance*"

H5: *"There is a statistically significant relationship with pre-issue P/E value and long-term performance"*

As a contribution, study offers a perspective to China's domestic IPO markets, first by focusing on progression of the initial returns during 2010–2012, with this empirical research the study is able to present the development of initial returns and results will be comparable to previous studies, as the same methods will be used. Secondly it examines the relationship between firm specific characteristics and long-term performance, which pursues results from the key predictors of the long-term performance of IPOs.

Limitations

Study includes only the A-series IPOs which are exclusively for domestic Chinese investors. Study does not include the IPOs of state owned enterprises (SOE) or the seasonal equity offerings (SEO). The focus is purely on the initial public offerings of private companies.

The sample consists 131 A-series IPOs from both, Shanghai and Shenzhen stock exchanges. The IPOs including to this study are unequally distributed between stock exchanges, as 111 IPOs were listed on Shenzhen stock exchange and 20 on Shanghai stock exchange. Additionally, the distribution of issues is unequal between research years.

1.2. Structure of the study

Introduction chapter conducts shortly the purpose of this empirical research. In the second chapter the principles of capital markets efficiency will be presented, from the view of stock valuation. Third chapter focuses on company's valuation, first by presenting the most common stock valuation methods, and subsequently examining the IPO pricing mechanisms. Fourth chapter exhibits the theories of IPO underpricing as it approaches this subject by diving the theories into four main categories which are: asymmetric information, institutional theories, behavioral theories and theories based on ownership,

control and monitoring. Fifth chapter focuses on presenting the long-term performance anomaly in global markets.

Since theoretical understanding is achieved, sixth chapter offers historical results from Chinese IPOs, by analyzing previous researches from IPO underpricing and long-term performance in China. This part focuses on the time period from 1987 to 2011. First, it examines the progression of initial returns. Secondly, examines the effects of the pricing mechanisms on the initial returns, and the development of those. Thirdly, sixth chapter summarizes the main factors which have caused underpricing among Chinese IPOs, while considering the difference between underpricing and markets' overvaluation. The results of long-term performance of previous studies are also exhibited in this section. Seventh chapter focuses on the data and methodology of this study, as it also presents the used equations and formulas. The empirical results of this study are presented in the eighth chapter, with a consideration of conducting future research in China's IPO markets. Chapter nine briefly concludes this empirical study and its key findings.

2. CAPITAL MARKET EFFICIENCY

Capital market efficiency is generally defined with information, as in the markets are efficient when the prices of the securities quickly reflect all available and meaningful information. According to this theory, the prices of the securities should change only when new pertinent information occurs to the markets. All changes in the security prices ought to happen as "random walk", and therefore markets cannot reliably predict the trajectories in security prices. The theory of the capital market efficiency maintains also an assumption which does not allow any available information to cause abnormal returns. All stakeholders in efficient capital markets will act rationally, in terms of pursuing maximal returns. (Nikkinen, Rothovius & Sahlström 2002: 80–82.)

Capital market efficiency can be distinguished into three different categories depending on the forms of efficiency: weak-form, semi-weak-form and strong form. In the existence of weak-form markets, all available price information is reflected to the security prices, and the existence can be interpreted with technical analysis. (Fama 1970: 383.) If the terms of weak-form efficiency are fulfilled, all kinds of abnormal returns are impossible to achieve with historical security price information (Malkamäki & Martikainen 1990: 35). In circumstances of semi-weak-form markets, all relevant public information regarding to the securities is quickly reflected to the prices, for example stock splits and announcements of quarter and annual earnings. Analyzing the semi-weak-form requires event studies and case-by-case data. On the highest form of efficiency – the strong form markets, the prices of the securities reflect all available information, even insider information. By analyzing the insider trading, the existence and strong-form efficiency conditions can be defined. (Fama 1970: 383.) There is a linear relationship among forms of efficiency. Therefore, markets have to accomplish the weak-forms before the markets can be considered fulfilling the semi-weak-forms of efficiency. In order to achieve the strong-form conditions, both of the lower conditions of efficiency needs to fulfilled too. (Malkamäki & Martikainen 1990: 35.) In theory, the capital market efficiency induces circumstances where abnormal returns are impossible to achieve (Nikkinen et al. 2002: 84).

Fama (1970) examined the forms of efficiency, and the results strongly supported the weak-form assumption, although he notified that markets are not able to absorb all relevant available information immediately to the prices of securities. Empirical study and its results concerning on semi-weak-form supported the theory of capital market efficiency, especially denoting that the information related to company's subsequent dividend payments and information about stock splits, were efficiently and on average completely absorbed to the price of a split share at the time of the split. As a conclusion, Fama remarks that markets which fulfill the strong-form efficiency should be seen as a benchmark.

Lowry and Schwert (2004) examined the forms of efficiency in IPO pricing process. Their study covered all IPOs from AMEX, NMS and NYSE stock exchanges during 1985–1999. Only IPOs with issuing price less than 5 $ were included to their sample. According to them there were two major findings related to underwriters. First, they remark that the preliminary price ranges of the IPOs set by underwriters, do not reflect all available information. Second, the final offer price of the issuing company similarly does not include all available public information, as underwriters disregarded part of them. Although as a conclusion they considered that the effects on the initial returns were insignificant and at large the underwriters' incorporation of public information was not remarkably different from an efficient IPO pricing process.

3. VALUATION OF CORPORATION

The value of the corporation bases on the value of its stocks. Therefore, the valuation of stocks is crucial in the IPO pricing process, and in understanding the underpricing. This chapter presents the most common models for defining the value of stocks, such as dividend valuation models, cash flow valuation model and capital asset pricing model (CAPM).

The fundamental (intrinsic) value of stocks (corporation) can be defined with cash flow model and dividend valuation model. The fundamental value for a corporation or its stocks can be defined by discounting all expected future cash flows or dividends to present and then summing them up. The purpose of the fundamental value is to describe the real value of the corporation or its stocks, and with this knowledge the initial returns can be distinguished to underpricing and overvaluation. (Kaen 1995: 949–951; Song, Tan & Yi 2014: 48.)

3.1. Valuation of corporation – literature review

Dividend valuation model

The most common valuation model for stock bases on the cash flows the stock generates to its owner, in terms of dividends. The price of the stock is defined as the present value of its expected future per share cash dividends, and its future selling price. Investors define their personal required rate of return, and it reflects what the investor is able to earn from another corresponding investment with equal risk. The general assumption is that the higher the risk the higher the required rate of return. With previous notations the equation for dividend based can be presented as below. (Kaen 1995: 197–199.)

(1) $$P_0 = \sum_{t=1} \left[\frac{D_t}{(1 + k_e)^t} \right]$$

where P = the price of an individual common stock, the subscript on P denotes the time when the price is observed. Hence, P_0 is today's stock price

D = cash dividends per stock, also subscripted for time
k_e = investor's required rate of return for the stock of corporation
t = time

With the above presented pattern, a sloppy price for a stock can be defined. However, the model is far from accurate since it pays attention only on three basic factors; time, cash dividends and the investor's required rate of return. It has its pitfalls since all corporations do not pay cash dividends and defining enough of accurate rate of returns is not an easy task as there are plenty of other variables which effect on the value of the stock. As a difference to the bonds, stocks have no maturity, those remain outstanding from the moment of the IPO. Therefore, predictions with this model cannot be considered accurate. (Kaen 1995: 199.)

In circumstances when the dividends of the corporation are expected to be equal in each year, the no-growth version can be applied for defining stock's value. The valid equation for such scenarios is following. (Kaen 1995: 199–200.)

(2) $$P_0 = \frac{D_1}{k_e}$$

where: P_0 = price of the stock
D_1 = equal annual dividends
k_e = investor's required rate of return for the stock of corporation

It is irrational to expect the cash dividends to be the same in the long run. The constant-growth version for defining stock value based on per share cash dividends is called Gordon's growth pattern. With a simple modification it offers more reliable prediction yet maintaining its simplicity, as it expects the annual growth rate to be the same in every year. The only transformation from the models presented above is the added g, which denotes the expected annual growth rate in percentages. (Kaen 1995: 200–202.)

(3) $$P_0 = \frac{D_1}{k_e - g}$$

where: P_0 = price of the stock
D_1 = dividends

k_e = investor's required rate of return for the stock of corporation
g = annual growth rate of dividends

The Gordon's growth-pattern can be transformed to a wider version which pays attention to the annual growth rate in per stock cash dividends, stock price and earnings are defined with the percentage ratio of earnings that corporation retains, and the return that corporation could achieve on its investment. When the percentage ratio of retained earnings is equal to the return that corporation is able to earn from new investment, the growth rate for dividends can be defined as following, $g = (b)(r)$, when b = percentage of earnings retained in the corporation, and r = return the corporation is able to earn on new equity investments. D_1 can also be expanded to $(E_1)(1-b)$, where E_1 denotes the expected earnings per share (EPS). Since corporation is able to do two things with EPS; retain them in the corporation or pay them out as dividends. D_1 can be expressed as the percentage of earnings retained, $(1-b)$ which is called as dividend payout ratio. Therefore, the previous equation is formed to following. (Kaen 1995: 204–207.)

(4) $$P_0 = \frac{D_1}{k_e} = \frac{E_1(1-b)}{k_e - br}$$

where: P_0 = price of the stock
D_1 = dividends
k_e = investor's required rate of return for the stock of corporation
E_1 = expected earnings per share (EPS)
b = percentage of earnings retained in the corporation
r = return the corporation is able to earn on new equity investments

Cash flow valuation

The previously presented equation can be applied for calculating the net present value of corporation based on its cash flows. Principle remains the same in the model, as only the denoting figures will change. Corporations have various assets which generate cash flows and based on the future cash flows, the present value of asset can be defined by discounting the expected cash flows to present with the discount factor. (Brealey & Myers 1984: 29–29.)

(5) $$NPV = C_0 + PV = C_0 + \sum \frac{C_t}{(1 + r_t)^t}$$

where: NPV = the net present value of the asset
PV = cash flows that asset creates, their present value
C_0 = accounts for all cash flows already generated by the asset at time 0
r = discount factor
t = time

Capital Asset Pricing Model

Capital Asset Pricing Model (CAPM) can be considered as a tool for investors to define the expected rate of return. The model derives the expected rate of return from market risk which is multiplied with corporation's individual beta, taking into account the risk related to a specific corporation. Thus, the model gives an estimate of the expected rate of return, which can be used in various pricing and estimating equations. The risk related to stock markets is called beta, coefficient for the entire stock market is 1 and the coefficient for an individual corporation can be any positive figure above 0, depending on the risk related to the corporation. (Ross, Westerfield & Jordan 1998: 383–391.)

(6) $$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

where: β_i = beta of an investment
σ_{im} = covariance between investment and market portfolio
σ_m^2 = covariance of return for market portfolio

Beta describes the correlation between investment and market, if the coefficient is below 1, it is called as defensive and maintains less risk than markets on average. If the coefficient is over 1, it is considered as aggressive and maintain more risk than markets on average. As an example, if beta is 1,1 and the markets surge by 10 percentages, the value of the investment surges *1,1 x 10 % = 11%*. (Ross et al. 1998: 383–391.)

Capital Asset Pricing Model includes various objects including risk-free rate of return, rate of return for market portfolio and previously mentioned beta coefficient, as an outcome it pursues expected rate of return for individual investment. General approach is

to describe the risk-free rate of return with the interest rates of state bonds, with equal maturity as the upcoming investment has. (Ross et al. 1998: 383–391.)

$$E(R_i) = R_f + x\,\beta_i\,[E(R_M) - R_f] \quad (7)$$

where: $E(R_i)$ = expected rate of return for investment
R_f = risk-free rate of return
$E(R_M)$ = rate of return for market portfolio
β_i = beta coefficient of an investment

3.2. IPO pricing mechanisms

There are various methods and ways to price and allocate initial public offerings. In this chapter the three most common pricing mechanisms will be presented, which are book-building, fixed price and auction. Depending on the pricing mechanisms and circumstances, one may increase the underpricing as another may reduce it. Therefore, it is crucial to understand the principles of different mechanisms. The effects of the different pricing mechanisms in Chinese IPO markets are presented in chapter six.

Book-building process

Book-building model was developed by Benveniste and Spindt (1989), as a solution for IPO pricing and allocation. In the book-building process the underwriters of certain IPOs pursue to gain information from their regular investors. Underwriters persuade investors to reveal their information of the markets or corporation during the pre-issue period, by allocating more stocks to these investors before allocating stocks to markets. In order the investors to be motivated to revel their information, they need to gain more profits by being truthful, compared to scenario when they reveal false information.

Sherman & Titman (2002) criticize the book-building model since it includes investors to the bidding process, as they consider the general approach is to exclude them. In circumstances when the investors are included to the bidding process, the book-building process can be considered as a convenient way of rewarding and favoring good customers, since the IPOs are underpriced on average. According to them, in circumstances of costless information, the ideal participation rate of investors is infinite

and level of underpricing approaches zero. Inversely, if acquiring information is expensive, the desire for information defines the level of underpricing. However, there is a possibility for such situation in which expected level of underpricing is equal to the costs of acquiring information, creating indifference among investors if they should participate to the IPO.

Derrien & Womack (2003) examined initial public offering pricing mechanisms in France. They found out differences between pricing processes since auction IPOs incorporated current market returns better to the offering price. Since underwriters controlled both; price of the IPO and access to vital institutional investors, corporations had no other choice than settle to the second-best underpricing outcome, if the applied process was book-building.

Fixed price offering

The principle of fixed price offering is simple, investors bid stocks with predefined offer price. When this model is applied, the price of the security will not reflect information from the markets. This breaks the first rule of capital market efficiency, the rule of weak-form efficiency.

According to Rock (1986) the underpricing of IPOs is inevitable in fixed price offerings. Without underpricing the underwriter is not able to compensate the uninformed investors as they face the winner's curse and end up winning relatively poor stocks, while investors holding better information take advantage of their knowledge, and encapture all better performing IPOs.

Ljungqvist, Jenkinson & Wilhelm (2003) examined the book-building and fixed price mechanisms with a data sample covering 2143 IPOs from 65 countries. According to them, book-building process was far more efficient as it produced less underpricing, compared to fixed-price offerings. As a downside, book-building process was more costly than fixed price offering.

Auction

In circumstances of auction mechanism, investors bid stocks with quantity and price offers the day before the IPO is issued to the markets, as it is corresponding to the sealed-bid auction. As a second step, market author calculates the expected demand for the stocks in the IPO after achieving knowledge about all bids. Once the expected demand is calculated, underwriter and issuer negotiate the price range in terms of offer and maximum price with the market author. In most scenarios the upcoming offer price of the IPO will be conciliated on a level what every selected investor will pay for the stock. All bids exceeding the maximum rule will be excluded, and in most cases the maximum level is chosen with a purpose to eliminate only unrealistic bids which are well over the clearing price. By applying this elimination method, they can prevent investors placing such high bids, which would guarantee the attainment of stocks. The main goal of this IPO allocation method is to achieve information about investors' fair vision of the value of issuing company, therefore elimination of unrealistic bids is appropriate. Investors who bid stocks with a price range between maximum and offer price will obtain stocks based on pro rata basis. (Derrien & Womack 2003: 31–61.) In this context, pro rata basis means that the stocks will be allocated to investors according to the relation of their previous holdings.

Derrien and Womack (2003) found out that in hot market conditions, the IPOs issued with auction method experienced significantly lower initial returns compared to corresponding book-built IPOs. According to them, the usage of auction method incorporates more information about market conditions to the price of the IPO. Consequently, the usage of auction guarantees a better efficiency for pricing, although it does not offer protection against overpricing, which is able to affect negatively on welfare.

4. UNDERPRICING THEORIES

The underpricing of initial public offerings can be explained with several theories, and in most cases there is more than one reason for underpricing. Theories explaining this phenomenon can be divided into four main categories. Theories based on asymmetric information, behavioral theories, institutional theories and last theories based on ownership, control and monitoring.

A wide scale empirical literature has documented significant underpricing among initial public offerings. According to previous literature and researches, the theories based on asymmetric information account for the best explanatory power, yet the rest of the theories remain their statistical significance. (Booth & Chua 1996: 292–293.)

4.1. Theories based on asymmetric information

As mentioned above, the asymmetrical information is the most common explanation in terms of explaining the initial public offering underpricing. Asymmetric information describes the unequally distributed knowledge and information about market conditions and companies between parties operating in the markets. In this context the most common parties are underwriter of the IPO, the issuing company and the investors at markets. In order to fulfill the assumption of unequally distributed information, one of these parties must possess more information from the issuing company, in terms of quality and potential or from the market conditions in terms of demand and supply. (Ritter & Welch 2002: 1802–1804.) Further in this chapter winner's curse, ex ante uncertainty, agent theory, signaling theory and underwriter reputation will be presented.

Winner's curse

According to Rock (1986) the underpricing of IPOs is a consequence of unequal knowledge among investors. The investors operating on the market can be divided into two different group depending on the information they have. These groups shall be called as informed and uninformed investors. The informed investors have more information and knowledge of the issuing corporations and the fair value of their stocks, as the

uninformed investors do not possess that corresponding knowledge. Therefore, they have this window of opportunity to take advantage of the information they hold and bid only for mispriced securities, which are profitable for them. They will bid only for better quality stocks, and in hot market conditions when the overall demand is on high level, there is continuously growing population of uninformed investors bidding blindly and pursuing all IPO stocks. Due to the high demand, investors are not able to win these auctions, and it comes more obvious that uninformed investors will obtain lower-quality stocks. In practice, the "winner" who won the auction actually loses, since he obtained relatively bigger proportion of poor-quality stocks. According to Rock's theory, the demand of informed investors is inadequate even to fulfill the supply of relatively profitably priced IPOs. Hence, markets cannot afford to lose the demand of uninformed investors and therefore all IPOs have to be sold to markets with some discount, in order to draw the attention among uninformed investors.

Beatty & Ritter (1986) offered an expansion to above presented theory considering an ex ante hypothesis. The uninformed investors will submit bids for better quality IPOs after they have faced the winner's curse problem, this leads into scenario where all initial public offerings need to be sold to markets with a discount, or full subscription will not be achieved. The difference between the degree of underpricing and conditional returns is directly related to the ex ante uncertainty, in terms of the real value of the issuing corporation. The winner's curse problem intensifies due to the increasing uncertainty, which makes facing greater losses more probable. Therefore, uninformed investors are not willing to subscribe IPO stocks without greater level of underpricing.

Keloharju (1993) investigated the winner's curse hypothesis with data from Finnish IPO markets. Data sample covered only 80 IPOs between 1984–1989. According to his research the Finnish environment is ideal for testing this hypothesis since the probability of the existence of lawsuit-avoidance and litigation costs risk is insignificant, for example compared to U.S. IPO markets. His results were consistent with Rock's theory, as the uninformed investors received mostly bigger proportions of IPOs with negative initial returns, and smaller proportion of IPOs with positive initial returns. Lewis (1990) tested Rock's theory with data from British IPO markets, the sample covered 123 IPOs during 1985–1988. According to his research the winner's curse also existed in the British IPO

markets, as the results were consistent with the hypothesis and similar what Keloharju documented from Finland. The uninformed investors obtained larger proportion of poor-quality stocks, in terms of weak initial returns, as the informed investors performed a lot better. Amihud, Hauser & Kirch (2003) examined the winner's curse hypothesis with a data sample from Tel Aviv Stock Exchange. Hypothesis received strong statistical support as on average the initial returns that uninformed investors obtained were negative and proportions from these IPOs were greater, due to the strong demand of uninformed investors. Participating in all initial public offerings offered a return of -1,18% or -1,77%, for 6 and 15 days holding periods after the IPO.

Signaling Theory

Signaling theory bases on assumption that the issuing corporation has more information of its quality and fair value than underwriter or investors. Underpricing is a form of signaling, the issuing corporation pursues to signal its quality and profitability to investors. They want to leave "a good taste into the investors mouths", and encourage them to bid their stocks in the seasonal equity offerings. The issuing corporation faces the underpricing as a direct loss, however they will be compensated with greater capital gains in the future, when they issue more equity. Poor-quality corporations have no other choice than incurring imitation costs in order to seem equal to good-quality corporations. Despite their imitation efforts, the real value of the corporation may be revealed after the initial public offering, but before seasoned offering. Poor-quality corporations are forced to make a decision regarding to their appearance, either they will disclose their quality and accept that they are unable to achieve as good capital gains at the time of the initial public offering and seasonal offering as good quality corporations, or they pursue to appear as good-quality corporation and face the possible loss if they get revealed. Theory suggests that the poor-quality corporations should not be able to afford to face this immediate loss in form of underpricing, and only good-quality can afford to that. Therefore, this model can be interpreted as an explanation for the underpricing of initial public offerings, which is in equilibrium with the corporation's quality. (Ibbotson 1975: 237–243; Welch 1989: 421–449; Allen & Faulhaber 1989: 303–304.)

Grinblatt & Hwang (1989) reformed previously presented signaling model to a two parameter signaling model. The model relies on the same basic assumption that the

issuing corporation has most knowledge and information of their future performance, in terms of cash flows. As they have the more information than outside investors, the management of the corporation still face the asymmetric information problem, and in order to overcome this obstacle they sell the IPO stocks to markets with a discount, and retain a proportion of the issued stocks in their personal portfolio. By these means the corporation is able to sign their good quality and their beliefs of profitable future to the potential investors. The results of the research asserted that the value of a given corporation has a positive relationship to the degree of underpricing which is positively related to the proportion of fractional holdings of issuer. With these results they were able to support their new found hypothesis and theory. They also reminded that corporations are able to signal their value with other means too, than by just retaining stocks or underpricing them. For example, high dividends are good way to signal their excellence, or by retaining high-priced auditors, investment bankers and advertising. After all they are giving money away.

According to Allen & Faulhaber (1989) corporations have other ways to convince potential investors about their good-quality. They can emphasize their pre-IPO operating results, structure of the incentives for highest management, venture capitalists' provision funds, quality of the board of directors as well as the quality of bank loans, in terms of interest rates.

Ritter and Welch (2002) investigated the underpricing of IPOs with a data sample covering 6238 companies from U.S. stock markets, during 1980–2001. Their results showed the initial returns were on average 18,8% during the research period, although there was significant variation, as in between 1999 and 2000 the initial returns were on average 65 %. The research applied Fama-French multifactor model and according to the outcome of regression, they were unable to confirm that the asymmetric information would explain all of the high initial returns as they considered it was highly unlikely. Underwriters did not bundle several initial public offerings together, which would have lowered the average uncertainty among investors, as reducing the need for underpricing among information models. As a final conclusion they considered that in circumstances of significant underpricing, the behavioral explanations, allocation of stocks and agency conflicts are more likely to have a better explanatory power.

Alvarez and González (2005) tested the signaling theory hypothesis and long-term performance of Spanish IPOs, with a sample covering just 52 corporations from years 1987–1997. The results they achieved were consistent with theories and previous researches (Grinblatt & Hwang 1989; Welch 1989; Allen & Faulhaber 1989), as the value of a corporation was positively related to the degree of underpricing which was positively related to the holdings of issuer. In Spain, main reason of corporations to sell stocks with discount in the IPOs seemed to be the drive to reach higher volumes and prices in the subsequent offerings, and without signaling their good quality, they were unable to perform as well.

Agent Theory

Baron's (1982) theory of the IPO underpricing relies on assumption that the asymmetry of information is between investment banker and issuer. Due to the better knowledge of market conditions, firm valuation and IPOs compared to the issuing corporation, the corporation is willing to use the services of the investment banker, in terms of advising and distributing stocks. This causes a moral problem, since the pricing disorders are under the responsibility of the better informed investment banker. Will the investment banker pursue for optimal issue price, or aim for greater level of underpricing in order to ensure all stocks will be subscribed in the initial public offering, and simultaneously relieve his own work? The level of asymmetricity in the information between issuing corporation and investment banker has a positive relationship with the uncertainty of issuing corporation of its value. Consequently, this is directly reflected to the level of underpricing.

Schenone (2004) examined the IPO underpricing with a sample of 1245 firms which were issued during 1998–2000. The research focused on asymmetric information between issuing corporation and underwriter, with two main objectives. In circumstances if the issuing corporation had an established relationship or banking relationship with the underwriter before the initial public offering, the information asymmetry between them should be significantly lower than without this pre-IPO relationship. As an argument for this, underwriter should know the company and its characteristics better since the company is already under monitoring. The results of this empirical study confirmed the existence of asymmetric information and its significance among IPO underpricing and

pre-IPO relationships. If the issuing firms had this relationship with prospective underwriter, the underpricing was on average 17 % smaller than in scenarios without this relationship. A banking relationship with underwriter caused the underpricing to be even on lower level.

Underwriter reputation

Beatty and Ritter (1986) considered an alternative suggestion for the reason of IPO underpricing, as an extension to the asymmetric information theories. The underwriter (investment bank) of an IPO and its reputation is a key determinant of underpricing. Underwriters enforce the underpricing equilibrium in order to protect their reputation. It is in the interests of investment bank to underprice the issue, even if they were able to define the real the price of the issue. If they will not underprice the issue, instead try to cheat investors by overpricing or not underpricing enough, their reputation suffers and they will lose potential customers. On the other hand, if they underprice the issue too much they will lose potential investors. This rationale bases on the winner's curse problem and ex-ante uncertainty. Due to the fact the winner's curse exists and underwriters cannot be sure at what price level the trading starts, they have to underprice the issue, as above mentioned, when the ex-ante uncertainty increases the winner's curse intensifies. The other conditions for this assumption are that underwriters do not have non-salvageable reputation capital at stake, on which to earn returns and profits. Last condition is an extension of previous, if underwriter underprices the issues too much or too little, the ability of earning profits for this non-salvageable reputation capital substantially decreases. The results supported the assumption since the underwriters which priced IPOs off the line, lost relative market share in subsequent years, however the relation is not completely robust.

Carter, Dark and Singh (1998) examined the impacts of underwriter reputation on the initial returns of U.S. IPOs. The underwriters were divided into three groups: "bulge bracket", "major bracket" and "submajor bracket", depending on their previous records in terms of prestigiousness. Results are evident, the best underwriters marketed larger, less risky and more established IPOs, which on average produced less market-adjusted initial returns. Vice versa, the less prestigious underwriters underpriced IPOs with substantially greater level.

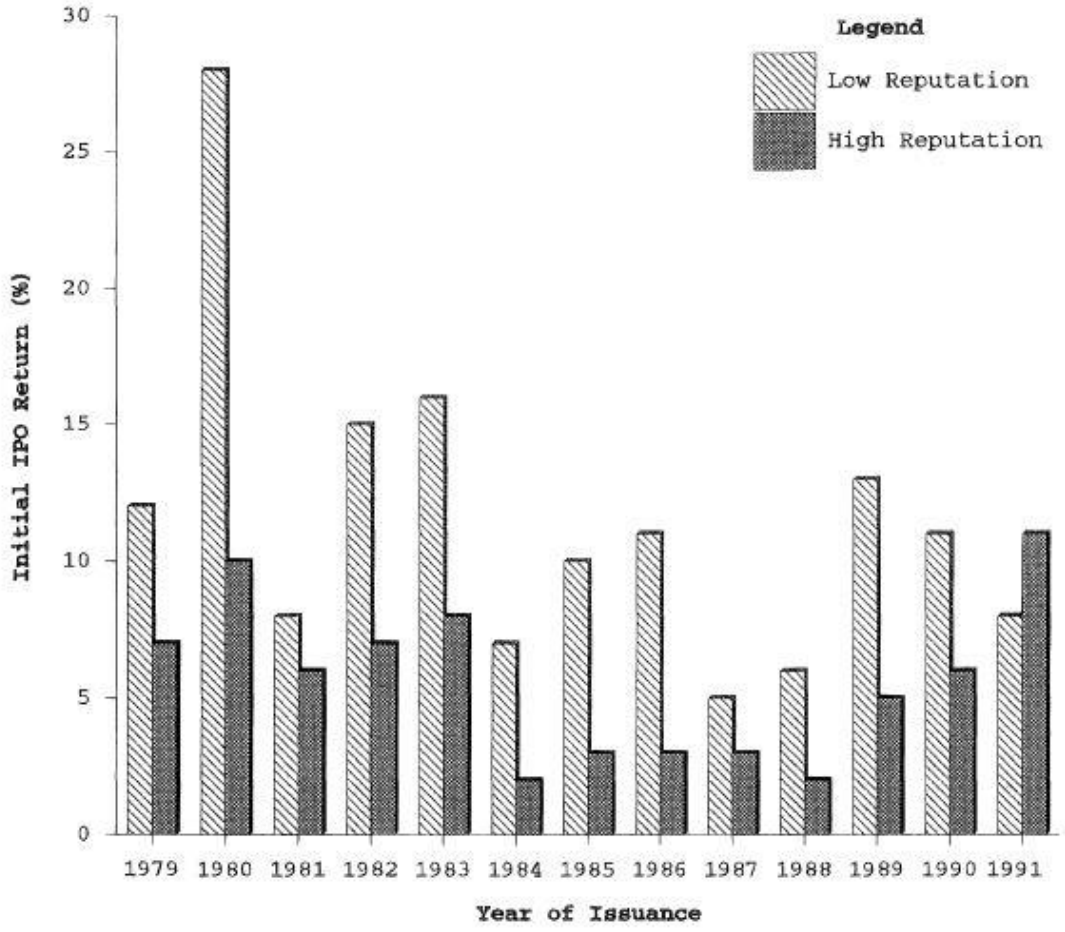

Figure 2.) Initial IPO returns. Market-adjusted initial returns of IPO companies divided into two categories based on the reputation of their underwriters, returns of 2292 IPOs issued in U.S. during 1979–1991. (Carter, Dark & Singh 1998: 300.)

Carter and Manaster (1990) received supportive results of the underwriter reputation. When IPOs were listed by non-prestigious underwriter, those experienced higher initial returns, correspondingly the IPOs issued by prestigious underwriters produced lower initial returns with less variance. According to them, the price run-ups in terms of initial returns are hazardous for the issuing companies, therefore the low risk firms (low dispersion) pursue to reveal their low riskiness to the investors by using prestigious underwriters. Consequently, the prestigious underwriters will only handle low dispersion IPO companies in order to maintain their level of reputation. The empirical results of their study confirms the negative relation between underwriter reputation and price run-up variance of initial returns. In addition, they also found a significant negative relation

between the underwriter reputation and the level of underpricing. The regression analysis was conducted with 501 U.S. IPOs issued in 1979–1983. Besides the underwriter reputation, the shares sold at the IPO by officers & owners and the age of the company reached the 5 % statistical significance, when those were the only independent variable. However, in the complete model, the underwriter reputation was the only variable receiving statistical support, as an explanation for the market-adjusted initial returns. Despite the low explanatory power of the full model ($Adj.R^2$ = 0,15), the underwriter reputation accounts for the most (0,12), reflecting its significance in comparison to others.

The results across studies confirm the underwriter reputation being an important factor in IPO underpricing, time after time the researches are consistent with the theory. Hence, it seems the underwriters as a matter of fact act rationally, pursuing the highest returns in the long run, instead of taking advantages of the window of opportunities. After careful consideration: the underwriter reputation itself will not cause underpricing, it is an explanation in the environment of asymmetric information which successfully combines the winner's curse, ex-ante uncertainty and agent theory.

4.2. Institutional theories

Underpricing as a form of insurance

Tinic (1988) presented a hypothesis for the IPO underpricing, which assumed that underpricing is a form of insurance against legal liability. Due to the Securities Act of 1933, investors in the securities market are heavily protected. Disclosing false and misleading information is forbidden and if investors face such, they have rights to sue persons who have signed the registration statement, or were otherwise associated with the initial public offering. By leaving enough money on the table and keeping investors satisfied, or in other words, underpricing the IPO with enough of high level, the issuing firms can insurance them against legal liabilities. The costs of getting sued and achieved poor reputation would be more harmful for the corporation, in comparison to the excess proceeds it would gain from overpricing. Keloharju (1993) examined the IPO underpricing with Finnish IPO data. He found out that the IPOs were underpriced, but

since in the Finnish environment the possibility of getting sued is insignificant, there needs to be also other determinants for IPO underpricing. Hughes and Thakor (1992) reported corresponding results as Tinic, the legal environment played a key role among the underpricing of initial public offerings. However, they conclude that on average litigation risk should not inevitably affect underpricing, if they rational expectations are taken into account.

Lowry and Shu (2002) examined the previously presented insurance and risk hypothesis with IPO data from U.S. stock markets. Their results showed that if corporation had a relatively high chance to get sued, the level of underpricing is greater. Data sample covered all IPOs during 1988–1995, and 4,6% of all those IPOs were either sued or under sue. The costs of getting sued, in terms of settlement costs, were on average 13,3 % of the proceeds raised from the offering. The results of the study were consistent with Tinic's theory, since the underpricing of IPO could have been seen as an effective form against all settlement and litigation cost, as it lowered the possibility getting sued. Therefore, it also reduced plaintiffs' potential recoverable damages.

In circumstances of insuring the IPO against litigation costs by means of underpricing, corporations should be constantly under the threat of getting sued, and likewise, suing corporations should be relatively normal. Therefore, the environment is a crucial factor, as there are significant differences between different environments. The U.S. stock markets are probably one of the few ones where this can cause underpricing and receive significant forms, for example compared to European markets, where the possibility of facing legal action and litigation costs is insignificant, due to the comprehensive prospectus system.

Price stabilization

Hanley, Kumar & Seguin (1993) examined the price stabilization hypothesis with data from U.S. stock markets, covering 1523 Nasdaq IPOs. According to the Security Exchange Act 1940, price stabilization is the only acceptable form of market manipulation. In circumstances of price stabilization, the underwriter can prevent a drop in market prices by entering a syndicate bids, after the IPO is issued, which are usually done at the issue price. Their results approved the hypothesis, since the usage of price

stabilization squeezed the bid-ask spread significantly. This narrower bid-ask spread existed especially during first fifteen trading days when the trading price was close to the offer price. As another observation they noticed the prices of the IPO stocks declined approx. 2,5 % if the markets assumed the price support to be given, therefore the price stabilization affected concretely to the trading price. By underpricing the issues, the underwriter is able to equalize these adverse effects the price stabilization causes.

Chowdhry and Nanda (1996) considered that by means of price stabilization, the issuing corporation and underwriter are able to keep uninformed investors satisfied, but only for a while. The price stabilization for the company will be given only for a short period, and the issuing company has to pay from this service, the IPO could have been just sold to the markets with greater discount. They concluded that underwriter should not apply the price stabilization, and thereby intervene the markets, since only the uninformed investors would be compensated. The greater level of underpricing would compensate both, informed and uninformed investors in a form of lower offer price, without intervening the normal market action.

The price stabilization disturbs the normal market action since it prevents efficient stock price formation during first trading days. Being also in contradiction with capital market theory, the price stabilization clearly breaks the rules of semi-weak-forms of efficiency, since the price of the stock does not necessarily reflect all available information from the markets. However, considering this from another point of view, would the absence of price stabilization cause more adverse effects? The first trading days are crucial to the breakthrough of IPO, and without the price support the stocks of the corporation might face deep tailspin in terms of quotation, causing more problems to the corporation, as for example the previously mentioned costs of getting sued. Therefore, this short period of mispricing should be seen as inevitable.

4.3. Behavioral theories

Behavioral theories explaining the underpricing of IPOs are mostly based on the behavior of individual investors. According to these theories the individual investors at the market will act irrationally. Hence, this chapter focuses on two of the most common behavioral theory explaining the IPO underpricing, the cascades and the investor sentiment.

Cascades

Welch (1992) introduced cascades hypothesis (i.e. fads hypothesis) as a potential reason for IPO underpricing. The hypothesis considers the subsequent individual investors will act irrationally after the issuance of IPO. They will not use the information they possess when they make investment decisions, and preferably by examining and relying on other investors' bidding offers, they make their investment decisions. The existence of few early investors who consider the offering being overpriced, can basically doom the offering to fail since later investors base their decisions on the previous ones. Correspondingly, if these early investors see the offering being a bargain, they have the ability to create incredibly strong demand towards the initial public offering. From point of view of the issuing company, the subsequent scenario is more preferably, and therefore they are forced to price the IPO with some discount. By underpricing the issue, the underwriter and issuing company will win the early investors on their side and the cascades effect is complete.

From point of view of the issuer, the existence of cascades effect is a benefit for company. In case the subsequent investors will not act rationally and they abandon their own information, relying on the earlier ones, these actions and bidding offers are no more informative to subsequent investors. Thereby the valuation of the corporation and its stocks will be inefficient, and will more likely create a preferable scenario for issuing corporation in terms of higher stock prices, as compared to scenario with higher and more accurate information flows among the investors. (Welch 1992: 696–697.)

Amihud, Hauser and Kirch (2003) investigated the cascades hypothesis with a data sample covering 284 initial public offerings from Tel Aviv stock exchange. The results of the study supported the hypothesis, indicating that either the demand for IPO stocks

was extremely high or low. With these remarks they were able to capture the existence of significant herding behavior among IPO markets and investors. Depending on the strength of initial returns, investors seemed to abandon their own information and relied on others'.

Pollock, Rindova &Maggitti (2008) examined if there was a relationship in terms of recent and available information from investors' decisions, and what were the influences in terms of investors evaluation and allocation of stocks. The main objective of the study was to emphasize the media, and how it affected on investors' evaluation and allocation. Their sample covered only 245 IPOs from U.S. stock markets, and according to the key findings, media played an important role affecting on the evaluation of investors. Especially the intracascade dynamics affected to the attention of investors, which can be interpreted as value for the corporation, and this view of the value is common for several investor groups. With these results the research proved the existence of cascades hypothesis.

Investor sentiment

Barberis, Shleifer & Vishny (1998) and Cornelli, Goldreich & Ljungqvist (2006) considered the investor sentiment accounts for the reacting and optimism of individual investors. Investors act irrationally, by being bullish (overoptimistic) and are willing to pay significantly more than the intrinsic value in cases when the sentiment is on high level. Correspondingly, when investors are bearish (pessimistic) they are not willing to pay enough from the stocks and thereby they will price themselves out of the markets.

Investor sentiment defines also the systematic risk, the risk which cannot be diversified, and volatility is a generally approved meter of risk. Sentiment has a negative correlation with the volatility of markets, as in the growth of volatility makes investors more bearish and correspondingly, decrease of volatility makes them more bullish. (Lee, Jiang & Indro 2002: 2295–2297.) The level of market sentiment can be interpreted with various ways however the most convenient way to define its level is by following volatility indices, for example VIX accounts for the implicit volatility of option prices of S&P 500 companies.

Derrien (2005) examined the influences of noise trading sentiment on IPO pricing with a data which covered 62 book-built IPOs from French stock markets. His model assumed that the information about company's fundamental value and investor sentiment were the most important factors affecting on the aftermarket price of IPO stocks. Noise trader is an irrationally acting investor since he will not examine the fundamental value of the company before decision making, instead takes advantage of the bid-ask quotes and thereby makes the investment decisions. Research showed there is a strong positive correlation between the demand of individual investors and the market conditions, which strongly influenced on the prices of the initial public offerings. In circumstances of hot market conditions, the noise trader sentiment, and the bullish behavior generates significantly high initial returns.

Ljungqvist, Nanda & Singh (2006) came up with a slightly different model considering the investor sentiment and distribution of stocks. According to their model the value of the issuing corporation is on the highest level, if the IPO stocks are allocated to underwriter's regular co-operative institutional investors, before the gradual sale. By storing stocks to institutional investors' portfolios, the underwriter is able to reduce the supply of IPO stocks by restricting the availability. The gradual sale will be completed in hot market conditions, by taking advantage of high sentiment and strong demand. The underpricing is required in order to maintain relationships with institutional investors by compensating them, since there is always a possibility of arising losses in case the demand and sentiment ceases. At the time of the gradual sale, when institutional investors release their holdings, the stock price returns close to its fundamental value. Of course in order to apply this model the stock manipulation by restricting the supply cannot be forbidden, and there must be enough of high sentiment in the markets. Thereby they conclude that the model is not relevant in most scenarios since it is not consistent with institutional reality.

4.4. Theories based on ownership, control and monitoring

Brennan and Franks (1997) approached the IPO underpricing with ownership point of view, as the owners of the IPO company have strong desire to maintain their power in terms of decision making. They are willing to avoid the possibility of getting under hostile takeovers, and by these means they pursue well distributed ownership structure among new shareholders. The wide dispersion will be achieved by underpricing the IPO with significant level, which would create strong and excess demand and since the stocks will be allocated with pro rata basis, the excess demand would guarantee relatively small proportions of shares to new shareholders. Thereby, the owners are able to remain the dominant decision making power, since the IPO would bring only more owners with small fractional holdings who are not able to conduct takeover and control the management of the corporation.

Booth and Chua (1996) reconstructed a model for explaining the IPO underpricing, one of its main assumptions is that significant level of underpricing is required and there are two advantages related to it. Underpricing the IPO leads to circumstances where the ownership is relatively broad, and it guarantees the good liquidity for the stocks of the issuing company. Large quantity of shareholders guarantees that there will be enough of information and constant on-going valuation, and as a benefit the market liquidity will be on higher level. Broad dispersion of ownership, good liquidity and amount of information of the company will affect positively on the equilibrium price of the stock in secondary markets.

Field and Sheehan (2004) argue about the relationship between IPO underpricing and control-maintaining. Their research sample contained 953 U.S. IPOs issued between 1988–1992, as the research focused on the effects of blockholders to the underpricing. Accurately, they observed the presence of blockholders, the fraction of the firm sold at the IPO, the presence of outside blockholders before IPO, the presence of venture capitalists before the IPO and the size of the firms. According to the results there was not any significant relationship between underpricing and outside blockholdings, since the underpricing had only an insignificant effect on those. 83 % of the companies involved to their research, had an outside blockholder before the time of the initial public offering. These results are strongly contradictory with the theory presented by Brennan and Franks.

Stoughton & Zechner (1998) created a model which pursues to focus on the effects of the ownership structure on the value of company. According to the model the relatively larger proportion of stocks should rather be allocated to the institutional investors. As a benefit for all shareholders, the large investors have greater ability to control and monitor the management of corporation. With improved accuracy in monitoring and controlling the uncertainty of presence and future will be significantly reduced, therefore it is inevitable to persuade blockholders in the IPO by means of underpricing, and eventually allocate greater proportions of shares for them. Favoring of blockholders increases the fundamental value of corporation due to the increased monitoring and decreased uncertainty, which more than offsets the lost equity that required underpricing caused. This model can be applied only in circumstances of book-building process, since the rationing and allocating of stocks cannot be completed through competitive allocating process, such as an auction.

5. LONG-TERM PERFORMANCE OF INITIAL PUBLIC OFFERINGS

The price performance of IPO stocks has been under large focus of literature and empirical researches. The long-term performance of IPOs is commonly measured with two different factors, over 6, 12, 24 and 36 months: (a) wealth relatives, which compares the performance of IPO stocks to similar companies on the markets by size and industry, or to an alternative benchmark, and with (b) market-adjusted buy-and-hold period returns. Another common attribute of IPOs is their weak long-term performance, an anomaly which exists in every market. (Ritter & Welch 2002: 1795–1822.)

There are two mainstream theories pursuing an explanation for the weak long-term performance of IPOs. The first one by Ritter (1991) assumes that in general equity and especially IPO markets are subjected to fads which highly affect the market prices. Fads, overoptimismn and speculation regarding to young growth companies result high initial returns, driving the trading prices up as individual investors in the market have relatively similar expectations from the company and its value. Over the time when the investors in the markets realize the real value of an IPO company, the interpretation of the company's value converts downwards causing the stock price to fall, as the fads and speculation of highly profitable future opportunities weaken. According to Schultz (2003) the weak long-term performance can be explained with pseudo market timing, since most of the companies tend to issue their IPOs during hot markets, i.e. when the general economy raises and trading volumes are on higher level. Hence, companies can receive the highest price for their stocks in these conditions. As a result of this issuing habit, the general level of IPO stock prices is on higher level. The IPO companies might not be aware that the prices are at peak during the issuance, and if prices keep on surging, there will be more and more companies issuing their IPOs until prices starts to plunge and the number of offerings will decrease substantially. Common for both theories, there is a link between short-run overvaluation and poor long-term performance, and the weak long-term performance is partially explained with the moderation of the overvalued trading price, however from different point of views, while not excluding each other.

Table 1. Worldwide results of the IPO underpricing and long-term underperformance.

Country	Paper	Sample period	Initial returns (%)	Long-term performance (%)
U.S.	Ritter (1987)	1977-82	14.8	-
	Ibbotson et al. (1994)	1960-92	15.3	-
	Ritter (1991)	1975-84	14.3	-29.1
	Loughran (1993)	1967-87	-	-33.3
	Loughran & Ritter (1995)	1970-90	-	-30.0
	Brav et al. (2000)	1975-92	-	-31.1
Great Britain	Jenkinson & Mayer (1988)	1983-86	10.7	-
	Levis (1993)	1980-88	14.3	-8.1
France	Jacquillat (1986)	1972-86	4.8	-
Germany	Ljungqvist (1997)	1970-93	9.2	-12.1
Japan	Pettway & Kaneko (1996)	1989-93	46.2	-
	Cai & Wei (1997)	1971-90	-	-27.0
Sweden	Rydqvist (1993)	1970-91	39.0	-
	Loughran et al. (1994)	1980-90	38.2	1.2
Swizerland	Kunz & Aggarwal (1994)	1983-89	35.8	-6.1
Australia	Lee et al. (1996)	1976-89	11.9	-51.0
Brazil	Arrarwal et al. (1993)	1979-90	78.5	-47.0
Chile	Arrarwal et al. (1993)	1982-90	16.3	-23.7
Korea	Dhatt et al. (1993)	1980-90	78.1	-
	Kim et al. (1995)	1985-88	-	91.6
Hong Kong	Chen et al. (2001)	1993-96	19.0	-
	McGuinness (1993)	1980-90	-	-18.3
Sinagapore	Koh & Walter (1989)	1973-87	27.0	-
	Hin & Mahmood (1993)	1976-84	-	-9.2

Table above comprises the main studies on IPO underpricing and long-term performance. Long-term performance is the buy-and-hold period return, depending on the study, from 2 to 6 years while initial returns are excluded. The computation methods vary depending on the study as well. (Àlvarez & González 2005: 327.)

Keloharju (1990) researched 91 Finnish IPOs issued during 1984–1989. The results were consistent with the assumption of weak long-term performance as the cumulative market-adjusted returns for 6, 12, 24 and 36 months were negative, being -3,2 %, -9,8 %, -22,9 % and -26,4 %, as the subsequent three of them were also statistically significant at 5 % level. The mean wealth relative compared to value-weighted index was 0,789, when the initial returns were excluded, reflecting the clear underperformance in comparison to general performance of index. By analyzing four different industries and issuing years,

Keloharju considered there were no major differences between neither the industries nor the issuing years. However, the negative abnormal long-term performance is more serious among small companies. His final suggestion for the weak long-term returns was consistent with Schultz's assumption, as the Finnish IPO markets were exceptionally active during the research period, the overoptimistic investors may have got disappointed as they became more aware of the characteristics of IPOs, resulting in the negative cumulative returns during longer period.

Aggarwal and Rivoli (1990) discovered the weak long-term performance with a sample of 1435 IPOs issued in U.S. during 1977–1987. Research examined the performance of IPOs only over one year (~250 trading days), and reported the mean market-adjusted (against NASDAQ) one-year holding period return was -13,73 %, as the median was -20,39 %. The research was conducted during hot markets, and IPOs generated abnormal positive returns in shorter investment period, however them turning to negative five months after the issuance. The cross-sectional analysis of 250 trading days indicated the weak long-term performance is more serious problem among smaller companies, yet being not completely robust. The overoptimismn and fads in the market received strong support as a reason for the long-term underperformance.

Ritter (1991) documented the behavior of weak long-term performance of 1526 U.S. IPOs, which were issued during 1975–1984. The research compared the three-year raw returns of IPO companies to the returns of matching firms by size and by industry. In comparison the underperformance was highly significant, the average three-year holding period return was 34,47 % for IPO companies, as it was 61,86 % for the matching firms. Results captured also a dependency of the size of the issuance and the average adjusted initial returns between the three-year holding period returns. Small IPOs tended to have higher initial returns, as in the lowest quintile the average adjusted initial returns were 27,45 % and the three-year holding period returns were 17,94 %, while the initial returns were excluded. Corresponding ratios for the highest quintile were 9,96 % and 39,81 %. Results reflect the significance of the size of the issuance, as also the possibility of fads and overoptimismn relating to small IPOs. Especially among small IPOs, higher initial returns were a sign of worse long-term performance, as the results were not that robust with larger IPOs. The age of the company had a strong explanatory power as well, the

most recently founded companies had the highest initial returns (29,42 %), and weakest three-year holding period returns (5,34 %), reflecting the overoptimismn related to young "high potential companies". Correspondingly, the oldest companies generated significantly lower initial returns (5,42 %), yet their three-year holding period returns were the highest (91,81 %). Ritter considered the ultimate explanation for weak long-term performance is the overoptimismn in the markets, which is taken advantage by the issuing companies, as those tended to go public at the time of market peak.

Ljungqvist (1997) examined the long-term underpricing phenomenon in German, with a sample comprising 189 IPOs issued during 1970–1993. During the research period, German IPOs were profitable till one year, if held for three years the investors lost on average 12,1 % compared to the market index. However, there were significant inside sample differences, as the average three-year holding period return in comparison to market index was -27,2 % during 1988–1990, and only -1,8 % during 1970–1987. Results strongly supported the presence of weak long-term performance of IPOs, however raising a question of the dependency of general market conditions, since the differences were enormous.

Loughran and Ritter (1995) focused on the long-term performance of U.S. IPOs issued between 1970 and 1990. The sample consisted of 4753 issues, and they measured the 3- & 5-year buy-and-hold period returns as well as their wealth relatives. IPOs underperformed the matching firms with a great magnitude, 3-year buy-and-hold returns were only 8,4 % for IPOs while the initial returns were excluded, as the corresponding ratio for matching firms was 35,3 %, resulting in the wealth relative of 0,80. Comparable ratios for 5-year buy-and-hold returns were 15,7 % and 66,4 %, as the wealth relative for the cohort was 0,7. These results indicated a strong presence of weak long-term performance of IPOs, which strengthened over the time. Weak long-term performance seemed to be a result of IPO misvaluation, since investors were bullishly subscribing IPOs in order to find big winners of future. Consequently, the systematic misvaluation of IPOs conducts to worse performance on longer period, as the investors find out their expectations are over-scaled when the returns of companies will not grow as expected. Therefore, the U.S. IPO markets during 1970–1990 cannot be considered efficient, since the prices of IPO stocks will not reflect the real values of stocks, instead reflecting the

expanded expectations and speculation. However, in the subsequent years of sample, the phenomenon got weaker since the long-term performance of IPOs increased substantially, affecting also positive wealth relatives for IPOs, simultaneously indicating about the improved efficiency in the markets.

Alvarez and González (2005) studied Spanish IPOs issued in 1987–1997, with a sample of 112 companies. The used methodology computed the 1-, 3- and 5-year buy-and-hold period returns. Furthermore, they calculated the abnormal holding period returns for each period by comparing several different alternative benchmarks; including value-weighted market index, size portfolio, B/M ratio portfolio, B/M & size portfolio and control firms. Wealth relatives for one-year holding period returns exceeded 1 in every class, as the abnormal returns for almost every class were positive, however any of the classes reached the statistical significance of 5 %. Statistically the most notable results appeared in the 3-year holding period returns, as two classes exceed the 5 % significance level: B/M ratio portfolio and size portfolio. The abnormal returns were substantially negative in every class, ranging from -18,59 % to -32,16 %. Findings from the 5-year sample suggested that on average the weak long-term performance exists especially between 1 and 5 years after issuance, since the abnormal returns were still mostly negative, though starting to turn positive and the variance between classes increased. Any of the classes no more reached the 5 % significance level. Research confirmed the positive relationship between the level of underpricing and long-term performance, in other words, the higher the initial returns were, the better the long-term performance, being in line with the signaling hypothesis. With a logistic regression analysis, they assessed the importance of different variables for the buy-and-hold period returns. The companies' amounts of assets one year before the issue was insignificant in every holding period, as well as the returns for assets one year before the IPO. Neither the size of the offering received any statistical support of being important variable in terms of buy-and-hold period returns.

Cai and Wei (1997) accomplished a research concerning on the long-term performance of Japanese IPOs, research was conducted with 180 IPOs issued in 1971–1992. They performed the comparison against 8 different portfolios, resulting in wealth relatives of less than one every time, as the wealth relatives decreased over the time too. Worth noticing, despite the poor performance compared to benchmarks, IPOs in Japan

performed rather well in general. Raw buy-and-hold period returns for 1, 3 and 5 years were on average 14,8 %, 34,2 % and 62,1 %. IPOs issued in subsequent years in the sample performed worse than the rest, especially during 1988–1992. As an alternative suggestion, the Japanese asset price bubble which lasted from 1986 to 1991, might have substantially affected to the IPOs through investors' trust to economy. Even though by using different portfolios we are able to conduct the comparable performance of IPOs, the method will not account for the investors' beliefs, as the IPOs can generally be considered containing more risk compared to the existing benchmark companies. The number of issued IPOs was significantly lower compared to previous years, which supports the assumption of bias in the results, and market conditions' explanatory power. When descriptive statistics were controlled by size, gross proceeds and M/B ratios, smallest companies had significantly higher holding period returns compared to large ones, measured over 5 years the difference was five times greater. When IPOs were categorized by gross proceeds, over the same time, the results showed the biggest issuances outperformed the smaller ones by 2,5 times. Low M/B ratio indicated better long-term performance than high ratio, difference being approximately twice. Across these results there seems to be highly negative correlation between initial returns and holding period returns. In every category, the companies which had the highest initial returns had also the worst long-term performance. However, since there is no actual statistical analysis about the significance and consistency of these figures, the statistical dependency of these variables cannot be robustly determined.

Lee, Taylor and Walter (1996) researched the reason for the significant long-term underperform of industrial Australian IPOs compared to the market movements. Data sample covered a total of 266 IPOs issued between years 1976–1989. An equally weighted investment in IPO shares for 3 years offered an average cumulative return of -51,26 %. According to the results of the cross-sectional multivariate regression analysis for the 1-, 2- and 3-year market-index-adjusted holding period returns, the level of underpricing (initial returns) was the only which had any statistical explanatory power at 5 % significance level. However, all of the independent variables (underpricing, issue size, time to listing & retained ownership) failed to explain the 3-year holding period returns. Hence, the relationship between long-term performance and initial returns can be considered as positive and curvilinear, as it subsided over the time.

Carter, Dark and Singh (1998) investigated the underwriter reputation and its impact on the long-term performance of IPOs. They presumed the better the reputation of the underwriter, the better the long-term performance, with a rationale that the higher quality underwriters attempt to market IPOs which will perform better in the long run, in comparison to other IPOs. Hence, by marketing IPOs with relatively better long-term performance, the underwriters are able to maintain their high reputation. The study was completed with 2292 U.S. IPOs issued between 1979 and 1991. With a cross-sectional regression model, they achieved results supporting the assumption, as the IPOs underwritten by more prestigious underwriters experienced on average less negative market-adjusted long-term performance when measured over three years. However, the results were not comprehensively robust. The underwriter reputation was divided into three different categories: high, medium and low. According to the Kruskal-Wallis test, all pairwise differences were significant at 1 % level, and when measured with more accurate Student's t-test, the difference in means for medium and high groups was significant at 5 % level. The difference between high and low groups was significant only at 10 %, in addition the difference between low and medium was insignificant. Thereby, these results can be seen as an indicator of the importance of underwriter reputation. Although the more accurate measures revealed contradictions in the results.

The long-term performance of IPOs and the most important variables explaining the phenomena greatly depends on the markets, market conditions and time period. Unique market specific characteristics are able to explain a part of the weak long-term performance, as in Australia the relatively strict regulation of IPOs compared to U.S. markets. The general weak long-term performance of IPOs is common for every market, as the magnitude of it depends mostly on the market conditions and investor sentiment. Empirical literature has also started to approach the phenomenon from another angle, if firm specific characteristics are able to predict the post-issue performance of IPOs. Common for most of the results is that the smallest companies have the worst long-term performance and vice versa. Furthermore, there seems to be a relationship between the initial returns and long-term performance, as high initial returns predict poor long-term performance in every research, except in one (Alvarez & González 2005). On the other hand, these can be considered as proxies for the individual investors' high expectations and inefficient pricing of markets. Worth noticing, when analyzing the firm specific

characteristics, the explanatory power of regression model is substantially weaker than in regressions which pay more attention to market conditions and investor sentiment. Logically, the explanatory power of the models also steadily decreases over the time, resulting in significantly weaker prediction accuracy.

6. IPO UNDERPRICING – HISTORICAL EVIDENCE FROM CHINA

This chapter presents historical evidence from the underpricing of Chinese IPOs, as well as from the long-term performance of those. At first, the trajectory of initial returns during 1987–2011 will be presented by referring the previous studies. Secondly, the chapter focuses on the pricing mechanisms, their reforms and on the effects they caused to the IPO underpricing. As a third step, the most important determinants of underpricing are presented, and last, the results of the long-term performance of IPOs according to previous researches are under examination.

6.1. The progression of initial returns over the time

Several researches in finance have proven that the IPOs of common stocks are systematically and significantly underpriced to their subsequent trading price, and the underpricing of IPOs in China has drawn much attention (Yu & Tse 2006: 363). This section presents chronologically the trajectory of initial returns according to the previous studies.

Figure 3.) Average initial returns of A-series IPOs in China. Sorted by research years, between brackets the research sample size. Every research will be presented below.

Su and Fleisher were one of the firsts who examined the underpricing of Chinese IPOs, their data covers IPOs issued during 1987–1995. Since the exchanges of Shanghai and

Shenzhen were established in 1990 and in 1991, the research also covered data from the time before market reform. The research sample consisted 308 domestic A-series IPOs, and on average the initial returns were massive 948,59 %, the extremities were extraordinary high, as the highest individual initial return was 38300 %, and the weakest just -18,58 %. (Su & Fleisher 1999: 173–176, 182.) These initial returns are unbelievably high, and the highest ones in the world. As a reminder, during the early stages of China's stock markets, investors had this opportunity to invest in stocks for the first time, and the supply of shares was moderate. Therefore, the imbalance between supply and demand, investor sentiment and bullish behavior may have been key factors explaining these sky-high initial returns. Mok & Hui researched the underpricing of Chinese IPOs with data from 1990–1993. During that period the initial returns were on average 362,3%, however the study accounted only for IPOs issued in Shanghai stock exchange, and the sample size was rather small, maintaining only 87 IPOs. (Mok & Hui 1998: 458,464.) There is already a huge difference between the results of these researches, since the level of initial returns has decreased almost three times. The results are not totally comparable due to the differences in samples sizes, research periods and markets, as the study from Su & Fleisher covered both exchanges and time period before the market reform, whereas Mok & Hui researched only IPOs issued in Shanghai.

Guo, Brooks and Fung (2011) completed a research which covered A-series IPOs issued in both exchanges, with an extensive sample covering 1660 IPOs during 1991–2009. The data of their study were well distributed as the quantity of IPOs issued every year was almost equal, results showed that on average the initial returns were only 84 %. Due to the long research period, the average initial returns are not able to explain the real path of progression and inside sample differences must be huge in order to be consistent with earlier studies. Chen, Firth and Kim (2000) investigated all IPOs issued to both exchanges which had relevant and available data, thereby the sample maintained 277 IPOs issued during 1992–1995. On average the initial returns of this sample were 350,47 %, indicating also about the consistency with results that Mok & Hui reported and confirmed that the level of initial returns did not decrease during 1990–1995. In their further research, Chen, Firth & Kim (2004) expanded the sample size to cover 701 IPOs, as the research period was 1992–1995 this time. Achieved results were rather similar, as on average the initial returns were 298 %, without any significant difference between the stock exchanges.

According to the documentation the weakest initial return during their period was only -18 %, as the highest was 3544 %. Tian (2011) examined the initial returns of Chinese IPOs, covering 1377 issued IPOs during 1992–2004. On average the initial returns were 247 %, as the sample accounted for both, Shanghai & Shenzhen exchanges.

With these results it is obvious that the trajectory of initial returns is heading downwards. The previously presented results from Tian and Guo, Brooks & Fung are based on almost equal sample sizes, and the difference between research periods is not meaningfully significant. Therefore, it is possible that Guo, Brooks & Fung have reported median figures instead of mean, or there are some major differences in the initial returns in the ends of research periods, which explain the contradiction between the results.

Chan, Wang & Wei (2004) investigated the initial returns during 1993–1998 with a sample of 570 IPOs. Results were consistent with assumption of weakening initial returns, as they reported that the initial returns were on average 178 %. Su (2004) examined 348 IPOs issued during 1994–1999, and the average initial returns were 124,2 %. In this 6-year research period, there were significant inside sample differences, as the initial returns were on average 314,5 % in 1994, 93,9 % in 1996, and during the last research year, 56,4 %. Such a rapid decrease of initial returns requires some serious explanations, for example changes in macroeconomic environment. Perhaps the 1997 started Asian finance crisis could account for a part of the change, or changes in regulatory environment.

Yu and Tse (2006) found out the average initial returns were 123,59 %, with a sample of 343 IPOs during 1995–1998. With these results we are able to confirm that initial returns had weakened. Chi & Padgett (2005) reported equal results as Yu & Tse achieved, on average the initial returns were 129,16 %. However, their sample was significantly larger, as it maintained 668 issued IPOs during 1996–2000.

According to Cheung, Ouyand & Tan (2009) one possible explanation for the decrease of initial returns is changes in China's regulatory environment. China had exercised two new laws, the Company Law in 1994 and the Securities Law in 1999. Before the Company Law, there were no standardized regulation related to disclosure mechanisms of information, and this new law clarified the regulations around the issuance and transfer of stocks. The Securities Law stated that companies which exceeded the listing terms

satisfyingly, were released from going through the regulatory examination process and were able to issue their stocks after the verification. The presented changes in regulatory environment must have influenced to the initial returns with decreasing means, as it is obvious the increased disclosure of information and thereby improved market efficiency, have reduced the asymmetry of information between IPO companies and investors.

Gao (2010) completed a research with 217 IPOs, and he found out that the average first day returns of IPO stocks were 157 % in China, during 2006–2008. Song, Tan & Yi (2014) researched the underpricing of IPOs in China, with a data sample covering 948 issued companies during 2006–2011. The results showed that the level on initial returns had decreased outstandingly, and on average those were just 66 %.

The results that Song, Tan & Yi and Gao provided, confirmed that the trajectory of initial returns has fluctuated, with significant means. A part of this variation in initial returns can maybe be explained with global financial crisis which started in 2008, and the strong upswing in world's economy before that. However, there is no researches available from IPO underpricing and initial returns of Chinese IPOs during 2001–2005. Thereby, this study cannot comprehensively identify and analyze the progression and circumstances of initial returns. In order this study to be completely accurate, Guo & Brooks (2008) examined the initial returns of Chinese IPOs with a sample of 286 initial public offerings, issued exactly during those years. However, they reported only the market-adjusted initial returns, which were 93,49 %. These figures fit well in the decrease of initial returns, though the ratios are not fully comparable, but market-adjusted initial return is rather good indicator in most circumstances, depending on the listing gap. The difference between raw- and market-adjusted initial returns will be presented in chapter 7.

Despite the strong decrease of initial returns during the examination period, those have been statistically on extremely significant level, as those have also been the highest ones in the world. For comparison, Koop and Li (2001) investigated the underpricing of IPOs in U.S. stock markets, with a huge sample covering 2969 IPOs issued between 1985–1998. Their results represent the enormous difference between these two economic environments, since the average initial returns were only 11,06 % among IPOs issued in U.S stock markets.

6.2. Pricing mechanisms in China

During the development of Chinese stock markets, the pricing mechanisms of initial public offerings have varied. The China Securities Regulatory Commission (CSRC) is the authority which has always determined the applied pricing mechanisms. (Cheung, Ouyang & Tan 2009: 695.)

During the early phases of China's stock market development, the CSRC ruled that the offer prices of IPOs needed to be determined by applying a given formula. The formula accounted the average of company's past three years' earnings, and the based on those the P/E ratio of the IPO stocks of issuing company should range from 13 to 15, as 15 was the ultimate maximum. The purpose of this calculation method was to avoid scenarios where bullish investment bankers project bullish earning, therefore this could have been seen as protecting investors. The price for the IPO stock given by this formula differs significantly from the overall valuation of stocks on the markets, for example in 1998 the average P/E ratio for stocks on the markets was closer to 50. This difference between pre-set IPO P/E ratio and overall market P/E ratio is enormous, obviously strengthening the demand of IPO stocks since the price increase will assuredly contract the difference between markets and IPO stocks once those are issued. (Cheung, Ouyang & Tan 2009: 695; Chi & Padgett 2005: 74.) According to Gao this can be considered as fixed price, since the offer price of issuing company is systematically determined, the IPOs will be systematically underpriced as well. Speculation around IPO stocks prevents the pure market pricing in these circumstances. (Gao 2010: 79.)

Systematical underpricing and strong demand among IPOs support each other, influencing even higher initial returns and raising the overvaluation of IPO stocks. When issuing companies are forced to determine their offer price by applying a specific formula, the underpricing of IPO stocks cannot be explained with all theories, since some of them become insignificant. For instance, issuing corporation is not able to signal their good quality with a low IPO price, since they are not even able to decide their offer price in the IPO. Even if there would be asymmetric information between the issuing corporation and investors, the hypothesis is irrelevant.

The book-building method was applied to general usage among domestic initial public offerings by CSRC in July 1999. The issuing company was able to take advantage of this method if they fulfilled the requirement of total capital equity, which needed to exceed 400 million RMB, if the issuing company had less equity, they were forced to use the old P/E based pricing formula. In the early stages after adopting the usage of book-building model, there were some seriously overheated IPOs, which had extremely high P/E ratios. Main reason for this was the inability of retail and institutional investors to determine offer prices. (Cheung, Ouyang & Tan 2009: 696.)

The CSRC adopted the complete usage book-building model for all initial public offerings in 2005, and started to revoke the restrictions. Eventually, CSRC deregulated all IPO pricing regulations in June 2009, and price formation became floating. Chinese IPO markets have seemed to become more market oriented after the book-building method was finally adopted, despite the fact that current book-building model cannot be considered completely driven by markets. (Gao 2010: 79; Yu & Tse 2006: 381; Song et al. 2014: 40.)

As another regulatory implementation, new set of Chinese Accounting Standards (CAS) were established in 2007, executing the new rules became mandatory for all listed corporations. Being almost identical with IFRS, the new CAS was a whole lot different compared to previous accounting standards. After the adoption of new CAS, corporations were able to incorporate underdeveloped assets to balance sheet, creating another problem. Managers of the corporation had now an incentive to overstate these assets to balance sheet, which would have otherwise been booked as depreciations. China used to have extremely conservative accounting standards and by executing those standards, the financial statement presented the fair values of assets better. Initialization of the new CAS might have affected negatively to the quality of accounting information, as it led to less conservative accounting. (Lin & Tian 2012: 128.)

According to Chan, Wang & Wei (2004), one of the major factors causing underpricing of IPOs during 1993–1998 was exactly the fixed price offering, in a form of P/E ceiling. As the P/E level of stocks at the time of issuance were on average 15, however once the trading of the IPO stocks started, the price quickly approached the overall market level. During their research period, the average P/E ratio for the whole markets was 36, and on

average the P/E ratio of issued stock reached figure 34 by the end of the first trading day. The average initial returns indicated similar results, being 178 % during the research period, which correlates well with the increase of P/E ratios during the first trading day.

6.3. Determinants of underpricing

Allocation, Supply and Demand

The main regulatory body, the CSRC has a strong control over China's stock market, especially in terms of primary markets, which are heavily regulated. The strong control is especially targeted towards the timing of IPOs, pricing- and allocation mechanisms of IPOs as well as controlling that which companies can go public. (Tian 2011: 81.) Several researched from the IPO underpricing in these circumstances considered that the early allocation method called lottery, accounted for a lot of the underpricing of IPOs. When this method was applied, the IPO stocks priced with fixed price (P/E), were randomly distributed to the investors in the markets. Su (2004) and Chi & Padgett (2005) considered that there was a strong imbalance between supply and demand, as the demand was significantly higher and therefore only a small fraction of the subscriptions acquitted stocks from the lottery. Thereby the chances of achieving stocks from the lottery depended on the amount of money joining the lottery. According to their study, there was a strong negative relationship between market-adjusted initial returns and the odds of "winning" the lottery. Due to the strong demand the stocks were easily overvalued, as more and more investors were willing to invest in a specific IPO. Guo & Brooks (2008) received similar results, and concluded that when lottery system was applied, part of the underpricing can be explained with the imbalance of supply and demand. Since the lottery system has become less relevant in China, they focused on book-building method and on Secondary Market Proportional Offering (SMP) which the CSRC introduced as a new distribution mechanism in 2002. When SMP is used, the new IPO stocks are distributed proportionally to investors based on the market value of their existing secondary market holdings. Consequently, investors with larger previous holding had a greater chance to obtain relatively bigger proportion of stocks from the IPO. According to their findings, the usage of SMP combined with book-building process can reduce the level of

underpricing, as issuing IPO became more efficient due to the reduce in the level of underpricing and increase in the stability of offering price.

According to Su & Fleisher (1999) fixed price offerings and lottery mechanisms should be considered only as a way to allocate oversubscribed stocks. They claim that the usage of these mechanisms should not be used for defining the aftermarket value or the initial supply of shares. Therefore, these mechanisms cannot cause the underpricing of initial public offerings.

The general demand for all kind of securities is strong in China's stock markets. When the IPOs are issued by using the fixed price offerings, investors were aware of the high possibility that the issues will on average be underpriced. Therefore, the risk related to the IPOs is obviously a lot smaller compared to the secondary markets. Since the IPOs are systematically underpriced in most scenarios, with speculating those investors are able to make almost guaranteed profit with a very low risk, if they only will obtain stocks form the lottery. (Chang, Chen, Chi & Young 2008: 10, 14.) Due to the possibility of Chinese individual investors being inexperienced, it is also possible that their bullish behavior drives the stock prices up since they are not able to define the realistic values of stocks and corporations (Chen, Firth, Kim 2000: 336). According to Chan, Wang & Wei (2004) the demand of domestic markets is not enough of powerful to generate high initial returns, instead the limited and regulated supply of IPO stocks by CSRC creates underpricing and overvaluation.

Time gap, liquidity risk and ex ante uncertainty

Several researches from China's IPO markets consider that the time gap is significant factor explaining the underpricing of IPOs. Mok & Hui (1998) investigated the influences of length of time gap between offering and listing on the underpricing of IPOs. They found a strong positive relationship between the level of underpricing and number of days between offering and listing. The longer time gap increased the uncertainty among investors and therefore greater level of underpricing is required in order to satisfy and convince the investors, thereby the increase in the time gap also produces ex ante uncertainty and asymmetric information. Tian's (2011) results also confirmed the importance of time gap, according to his cross-sectional regression model the time gap

accounted for approximately 30 % of the variance of initial returns (adjusted R-square), if the comparison was proceeded inside certain industry. In circumstances of long time gap, it is possible that the performance of given corporation might vary, thereby increasing the uncertainty related to issuing corporation, and confirming the consistency with ex ante uncertainty hypothesis.

The findings of Chen et al. (2000) suggested that the increase in days between offering and listing increased the level of underpricing due to the weaker market liquidity of IPOs during that period, as those are difficult to liquidate. They distinguished their IPO sample from years 1992 to 1995, into two portfolios, depending on whether the length of listing gap exceeded 2 months or not. The difference between these two portfolios was huge, when the gap exceeded 2 months the market-adjusted initial returns were on average 456 %, and if the gap was less than 2 months, the corresponding ratio was 128 %. Chan et al. (2004) investigated the time gaps and results reported that the median gap was 143 days in 1993, and 34 days in 1998. Results indicated that the time gap had shortened significantly in subsequent years, yet there was no mention about the importance of time gaps in terms of underpricing, or differences in the initial returns whether the time gap was over or under median.

Further research from Chen et al. (2004) performed corresponding tests as previous, however with bigger sample size, containing 701 IPOs issued between 1992 and 1997. Methods remained same, as they compared the initial returns whether the listing gap was over or under 2 months. Results showed more significant difference with this data sample, if the gap was greater than 2 months, initial returns were on average 631 %, whereas if the gap was shorter than 2 months the comparable ratio was 110 %. According to their interpretation this is caused by the long lock-up period when investors are not able to liquidate these holdings. Due to this lack of liquidity for the stocks, the investors are not able to define the real values of these stocks and in order to receive full subscription for stocks, those need to be issued with offsetting discount. (Chen et al. 2004: 291–293.) Since the companies between samples are rather well distributed, as the group with gap under 2 month contained 404 companies and the group with gap exceeding 2 months accounted for 297 companies, these results can be considered as reliable and describing well the circumstances under variation of time gap.

Yu & Tse (2006) claimed the time gap between offering and listing is unable explain strong underpricing of initial public offerings. The research investigated companies in which the government was a blockholder. According to the results, investors maintained higher confidence towards the issuing company if the government remained as blockholder after the issue, since the government reduced the future uncertainty of issuing company as it required higher retention of equity, thus the issuing company was able to sell the stocks to the markets without such high discount.

These researches are not fully comparable since Yu & Tse considered the effects of governmental ownership, as Chen et al. did not mention about it. Despite that, there is no arguing of the importance of time gap, and its length. The decrease of liquidity in terms of increased listing gap, is partially able to account for the increase of initial returns and level of underpricing. As other possible reason, the rapid development of China's stock markets during 1990s and thereby constantly increased unpredictable regulation might have caused increase in uncertainty among issuing companies and investors. Hence, also increasing the ex ante uncertainty, as the investors might have required more returns on their investments due to the increase of risk. From another point of view, the issuing companies might not have been sure from their realistic value, yet being willing to receive full subscription on their stocks, and therefore willing to underprice their stocks.

Signaling hypothesis

Several studies have supported the signaling hypothesis, as others have argued against it, thereby its explanatory power is contradictory in circumstances of Chinese IPOs. Su & Fleisher (1999) studied the hypothesis in China during 1987–1995, and their results were consistent and supported the theory. If Chinese IPO companies had underpriced their issue with greater discount, they were more likely able to obtain higher price and volume in the subsequent offerings.

Yu & Tse (2006) questioned the significance and existence of signaling hypothesis in the Chinese markets. Their research argued that abnormally high initial returns in the initial public offering cannot be explained with the relative size of the SEO. Their main objectives were to investigate the stock-price response to the announcement of SEO, post-issue returns and underpricing in order to find the relationship, and the study was

completed with a sample of 215 IPOs. According to the results, by the time of the publishing of SEO prospectus, the SEO news were not new, as the stock price already accounted for that. Su (2004) also received results which were not able to confirm the signaling hypothesis, and based on the results it was more likely that ex ante uncertainty and winner's curse had greater explanatory power for IPO underpricing.

As a reminder, the research periods differed from each other's, as Su & Fleisher were able to confirm the existence of signaling hypothesis during 1987–1995 and after that era, none of the researches have supported the theory, thereby the contradictions can maybe be partially explained with the difference in the time frame. However, it is also worth noticing that when the hypothesis received support, the only possible way of pricing the IPO was to use the P/E ratio based fixed price formula, and on average the initial returns were roughly 950 % during the research period. Consequently, there is another contradiction with the results, even though the t-values and coefficients would receive significant levels, is there rational causal relationship between the measured factors? As previously mentioned, if the issuing company is not even able to decide their issuing price, how are they able to signal their excellence by using their issuing price for that purpose?

Winner's curse

Su (2004) completed a set of empirical tests during 1994–1999, which received strong support in terms of winner's curse hypothesis. The results showed that in comparison between the informed- and uninformed investors, the informed investors obtained stocks from IPOs where the initial returns were prominently higher. They divided the investors into quintiles, average initial returns for the investors in the highest quintile were 64 %, as for the lowest quintile just 17 %. This almost quadruple difference was highly significant, verifying the existence of "lemon's problem".

Chi & Padgett (2005), and Yu & Tse (2006) also documented the winner's curse problem among individual Chinese investors, as both papers studied the phenomenon during 1995–2000. They considered that the winner's curse problem is more significant in China, than in any other emerging market, due to China's unique market characteristics and environment. First of all, over 90 % of all individual investors in China are highly

unexperienced in terms of investing, as they also do not have adequate access to relevant information. According to them this group of investors accounts for unexperienced, due to the large size of it and its vitality to markets, the CSRC is forced to control the prices of initial public offerings with P/E ceilings as well as limit the supply of IPO stocks in order them to have high initial returns, and by these means they pursue to keep uninformed investors satisfied and operating in the markets. Secondly, the China's stock markets can be considered as relatively immature, which have weak market efficiency. The poor availability of relevant information is real problem for this group of individual investors, and it makes the relative proportion of uninformed investors significantly greater, in comparison to any other emerging country.

Investor sentiment

Gao researched the IPO underpricing and initial returns by using three factors which were market sentiment, the individual investor subscription and behavioral theory, between years 2006 and 2008. The comparison accounting for the differences between the first-day end price of an IPO and the fundamental value of IPO were derived with the industry median P/E ratio, and the study gave strong signs that the investor sentiment has a higher probability to generate overvaluation among the individual investors. Their research suggests the higher level of underpricing is not an effect of positive primary market return, instead positive primary market returns have higher probability to reduce underpricing. According to these previously mentioned results, they were convinced that the underwriter and IPO company are willing to maximize the offer price in circumstances of high investor sentiment, and thereby take advantage of the bullish behavior of individual investors. The research was unable to ensure and find evidence for hypothesis where the IPOs are more underpriced if the markets are cold, and investor sentiment is on lower level. (Gao 2010: 78–88.)

Song et al. (2014) examined 948 Chinese IPOs issued during 2006–2011, as they were researching the overvaluation and underpricing. They did not find any support for theory that there exists a relationship between investor sentiment and IPO underpricing. However, their results presented a positive relationship between overvaluation and investor sentiment. They considered the overvaluation accounts for more than the underpricing in terms of initial returns, in China's IPO markets. Their results suggested

the initial returns which were on average 66 %, consisted from underpricing with weight of approx. 14–22 % and from overvaluation with weight of approx. 44–53 %. The research divided the initial returns to overvaluation and underpricing by comparing the offering price to the fundamental price of the stock and to first-day market close price.

The presented contradictive results will not necessarily deny the existence of the investor sentiment theory in China's IPO markets, which considers that when the sentiment among investors is low, the companies are willing to underprice their IPOs as a proof of full subscription. Worth noticing that the CSRC regulates the timing of IPOs, hence the CSRC might have been avoiding issues during cold markets since large IPOs attach lots of capital, which are attractive too, and if there is no inflow of money to the markets, the supply of capital is limited. The investors have to sell a part of their exiting holdings, which might cause more adverse effects in the markets. As also known, there exists a greater chance of fail in the IPO if it is issued in cold market conditions. Results of these researches are consistent and offer a strong sign that most of the Chinese individual investors act bullishly and are uninformed. Obviously the asymmetry of information is strong in the China's IPO markets. The lack of information among individual investors can also create information cascades, and information cascades and investor sentiment have multiple common factors. The results seem to support the theory as well, despite none of the research mentions this.

Underwriter reputation

While examining the underpricing of IPOs in China, Chen, Firth and Kim (2004) included variable measuring the importance of underwriter reputation. With a dummy variable accounting for if the IPO was underwritten by one of the six largest underwriters in China, they received results which were insignificant (t-value = 1,71), though consistent with the theory since the initial returns were lower if the IPO was underwritten by better underwriter. The study was conducted with data covering 701 issues issued in 1992–1997. Su & Bangassa (2011a) researched the underwriter's impact on initial returns with more accurate measures, with 590 IPOs issued in both Shanghai and Shenzhen during 2001–2008. They had three proxies measuring for measuring the excellence of underwriter, first accounts for the registered amount of capital, the most prestigious underwriters have highest amount of capital. Second proxy measures the relative market share of IPOs

issued by underwriters, more accurately the relative amount of issued gross proceeds by a given underwriter in comparison to all issued gross proceeds. During the research period the top 10 underwriters (out of all 57) issued 80,62 % of all IPO gross proceeds to the markets. The last proxy measured the quantity of IPOs issued by each underwriter, with an assumption that the more IPOs underwriters have managed, they also possess higher reputation. Comparison between groups (low, medium & high) with pairwise tests gave no statistical support that the initial returns would be different between groups. The results were same for each proxy. Cross-sectional regression results were in line with pairwise test results, none of the proxies reached 5 % statistical significance, though all of them indicated that the IPOs issued by prestigious underwriters experienced lower market-adjusted initial returns.

Since both studies from different eras found no statistical significance, it is possible the underwriter reputation is not a significant factor in China, or the market inefficiency and irrational behavior among individual investors may explain why these models are not able to capture the phenomenon, if it even exists in Chinese IPO markets. Perhaps with more accurate subsamples some evidence could be found.

6.4. Long-term performance of Chinese IPOs

The weak long-term performance of Chinese IPOs is documented in multiple studies, however mostly with different point of views and from different eras. Hence, comparing the results is not unambiguous, as the circumstances and regulatory environment are different almost in every study. Table 2 presents the conducted studies which will also be discussed below.

Table 2. Historical evidence of the IPO underpricing and long-term underperformance in China

Paper	Research period	Sample size	Initial returns (%)	Long-term performance (%)	Wealth relative
Mok & Hui (1998)	1990-93	86	289.00	-	-
Chen, Firth & Kim (2000)	1992-95	277	350.47	-21.20	0.8368
Chan, Wang & Wei (2004)	1993-98	570	178.00	-	0.924
Su & Bangassa (2011)	2001-2006	391	96.90	-18.16	-
Song, Tan & Yi (2014)	2006-2011	948	66.00	4.10	-

Table above presents the relevant long-term performance studies conducted in China. Initial return measures are not equal in all studies since some of them apply raw- and some market-adjusted returns. Long-term performance accounts for 3-year holding period return, except in study conducted by Mok & Hui. Depending on the study the benchmarks vary. Table will not present long-term performance ratios or wealth relatives if those are not available for the entire sample. Wealth relative accounts for the presented long-term performance figure. All studies will be discussed below

Mok & Hui (1998) were the first to examine the aftermarket performance of Chinese IPOs. They researched the excess cumulative returns (mean of stock returns minus the Scholes-Williams beta-adjusted market returns) of 86 A-series IPOs during 1990–1993, while pursuing answer for the existence of aftermarket inefficiency in forms of speculation or fads. Based on the initial returns the sample was divided into two group, underpriced and overpriced IPOs. From the early trading days, the overpriced IPOs outperformed the underpriced by a significant difference. The excess returns of overpriced IPOs were positive the whole 350-trading day (approx. 1,5 years) research period, being around 25 % in the end of the period. Correspondingly the underpriced IPOs experienced negative excess returns till 75-trading days, during the subsequent observation period the excess returns of underpriced IPOs were positive as well, however being positive by only few percentages. The results are contradictory with previous studies of speculation from other markets, since usually IPOs started to experience

negative returns after one year the due to the burst of investors' expectations. Hence, it can be considered the Chinese aftermarkets were systematically inefficient, rather than speculative. However, the sample is rather small in order to represent robust results, as the research period may not be able to capture the whole phenomenon.

Subsequent study of the long-term performance of Chinese IPOs conducted by Chen et al. (2000) measured the buy-and-hold period returns of 1-, 2- and 3-year, also focusing on the cross-sectional determinants of the aftermarket performance. They observed 277 IPOs issued in both, Shanghai and Shenzhen stock exchanges during 1992–1995. Average one-year market-adjusted holding period return was approx. 20 %, two-year holding period return was few percentages positive in Shanghai as it was few percentages negative in Shenzhen. The largest gap was in the three-year holding period returns, IPOs issued in Shanghai experienced an average return of -26,06 %, while the IPOs issued in Shenzhen outperformed them significantly by being -8,27 %. The results indicate the about the existence of speculation on the market since the returns faced a downward trajectory after one year, and turned negative before three years. Thus, the results are consistent with the theory. The above represented listing lag also seemed to be able to explain the differences in three-year holding period returns. Whether the gap was under or over two months, the average returns were -8,47 % and -27,16 %. Due to the increased uncertainty in long listing gap IPOs, the initial returns increased. It also correlated negatively with the aftermarket performance, however the statistical relation of this is not represented in the research, only in descriptive table. Further in the paper, the results of the multivariate regressions reveal the explanatory power of listing gap in terms of 3-year holding period return, the slope coefficient is negative, yet it did not reach any kind of statistical significance (t-value -0,4238). The most important variables explaining the aftermarket performance were age of the company, if the company accomplished SEO subsequent to the IPO (dummy) and the issuing year (dummy). The higher age of the company indicated worse long-term performance, as a result being totally contradictorily with findings of Ritter (1991) from U.S. markets. If the company accomplished SEO during the three-year observation period, its performance was significantly better by being 19,63 % higher. The issuing year had the strongest impact on the long-term performance, if IPO was issued in 1992 the long-term performance was on average 50,57 % better. However, in these circumstances it is obvious the year of issuance mainly

accounts for the macroeconomic factors and general conditions of stock markets. Statistical support was not given for factors which usually explain the phenomenon, such as: initial returns, amounts of assets before going public and the rate of earnings growth during the three-year aftermarket period. They conclude the regression model of 16 explanatory variables having either poor or moderate ability to explain the long-term performance of IPOs, however noting the markets are rather new and undeveloped, leading into market inefficiency.

Chan et al. (2004) followed Ritter's procedure and formed three benchmarks (size-matched, B/M matched and size- & B/M matched portfolios) in order to measure the post-issue performance of IPOs. The sample contained 570 IPOs issued in 1993–1998. Throughout the sample, the IPOs experienced positive cumulative returns, on average the 12-, 24- and 36-month returns were 11,55 %, 30,66 % and 75,07 %. In comparison to the benchmark portfolios, the IPOs underperformed them systematically, although not by much. Wealth relatives were only few decimals away from one, therefore the level of underpricing can be considered modest in comparison to for example Japanese IPOs which wealth relatives ranged from 0,67 to 0,77, when measured over the three-year holding period. During this era, the pricing of IPOs was regulated with P/E ratio ceiling of 15, and all IPOs were issued with that price. However, the general market P/E ratio was on average 33,2–38,39, on the listing day the P/E ratios of issuing companies peaked to 34,65, on average. The after P/E ratios for 1, 2 and 3 years were 29,5; 31,09 and 38,9. The development of P/E ratios indicates the IPOs will be overpriced by investors right after entering the secondary markets, and the fads drive prices up until investors in the markets realize the overreaction. Around year after the issuance the valuation has moderated on the realistic level, and afterwards it starts to grow again depending on the performance of company. The paper considers also the effects of the changes in ROA, operating cash flow on assets, net sales growth, net sales over assets and growth rate of capital expenditures. All changes in the variables were defined as the difference between one year before the issue, till the end of holding period. Measured over one and two years, ROA, operating cash flow on assets and growth rate of net sales received statistical significance with positive relationship in explaining the holding period returns. However, only the growth rate of net sales was able to explain the three-year holding period returns.

These findings confirm the later performance of company's stock is not driven by speculation, more likely the price reflects the operation performance of company.

Su and Bangassa (2011b) accomplished a research concerning on the long-term performance of Chinese IPOs and underwriter reputation's effects on it. The data covered 391 IPOs issued during 2001–2006. During the research period the IPOs underperformed the benchmark (SHSE & SZSE A-Share Index) systematically. The abnormal buy-and-hold period returns of 1-, 2- and 3-year were on average, -6,01 %, -14,57 % and -18,16 %. The comparison between 3-year holding period returns when IPOs were divided into three groups depending on the underwriter reputation reveals the importance of it. The IPOs issued by the best underwriters experienced on average an abnormal 3-years holding period return of -0,45 %, as the IPOs issued by the underwriters with lowest reputation generated an abnormal return of -42,91 %. T-values for differences in subsamples reached 1 % significance level in two pairwise group comparisons: low vs. medium & low vs. high. Group medium vs. high reached the statistical significance only at 10 % level. The cross-sectional OLS regression reports similar results, the better the underwriter the better the long-term performance of an IPO. The larger size of the issues also indicated about the better aftermarket performance, as did the EPS ratio, both having positive relationship at 1 % significance level. The fraction of tradable shares by the total shares outstanding had only moderate positive relationship with aftermarket performance, at 10 % level. Obviously, the standard deviation of returns of a given company had a negative and significant relationship (at 5 % level) with aftermarket performance. The average 3-month return of A-share index before the offering had no explanatory power, neither did the dummy variable accounting for the IPO companies if they operated in tech related industry.

Song et al. (2014) examined the long-term performance of IPOs issued in 2006–2011, with a comprehensive sample of 948 IPOs. Being consistent with previous studies they measured the 1-, 2-, and 3-year abnormal buy-and-hold period returns. As explanatory variables they used the uncertainty related to the issuing company (variance/mean of forecasted prices by analysts), EPS, age, size of the issuance and investors sentiment. The average buy-and-hold period returns for 1, 2 and 3 years were -14,4 %, -17,7 % and -7,9 %. The initial returns had statistically the strongest impact on buy-and-hold period

returns, consistent with the theory, the relationship between them is negative in each group. Interestingly, initial returns had lower explanatory power with shorter buy-and-hold period, as the explanatory power grew more than double between years one and two. EPS had positive relationship with returns in each group, being significant at 5 % level, though the impact was not that strong. Age of the company had no statistical explanatory power in any group, this might reflect the transformation of markets and companies, since it strongly argues with the theory and previous studies from Chinese IPOs issued in early 1990s' (Chen, Firth & Kim 2000). As mentioned in previous subchapter, they also researched the initial returns, whether the underpricing or overvaluation was more significant. Initial returns and overvaluation both had significant negative relationship with long-term aftermarket performance, though according to the results the overvaluation had better predicting power in terms of aftermarket performance.

6.5. Summary

Based on the above discussed researches the underpricing of IPOs has been statistically very significant phenomenon in China, however it has been weakening. There is a lack of researches conducted in Chinese IPO market circumstances, due to that all IPO underpricing theories cannot be justified with earlier researches. The most important reason for IPO underpricing in China have seemed to be the regulatory environment, which is unique compared to any other sophisticated markets. CSRC regulated the applicable IPO pricing mechanisms, timing of issues which causes listing lags as well as the allocation of shares. Hence, some of these produce underpricing by themselves, and some of them through asymmetric information theories. After the regulatory environment, the asymmetric information theories have the best explanatory power, especially winner's curse and ex ante uncertainty are key factors, both being strengthened by the regulatory environment. Part of the factors cause rather overvaluation than underpricing, such as fads among investors, investor sentiment and generally the behavior of investors. Due to the regulation which forced the companies to underprice their issues, the awareness of investors about this, limited supply of shares and high demand due to the bullish behavior of investors drive the prices of IPOs up, them exceeding their

reasonable values significantly. As a result, all of these together produces strong price pressure towards IPOs.

The long-term underperformance of IPOs exists strongly in China; all studies support the theory that IPOs underperform their benchmark indices on 3-year period, depending on the used benchmark and research period, the deepness of underperformance varies. When the long-term performance of IPOs is examined in steady market conditions, the most severe overoptimismn and fads exists during the first year as by the end of second year the prices have reached bottom, while the prices tended to recover during the third year.

In addition, the independent variables explaining the weak long-term performance highly depend on the era. In earlier studies, the weak long-term performance was best explained with the issuing year and macroeconomic factors, also if the company did not accomplished SEO, however, not with initial returns nor with rate of earnings growth. Further study considers the long-term performance depends on the growth of net sales rather than the growth of ROA or other variables. Only the researches conducted in the 21st century found consistent result with researches conducted in other markets, as issue size, EPS and initial returns explained the long-term performance the best.

Surprisingly, neither of the studies focusing on the underwriter reputation could not find any statistical support for the underwriter reputation to explain the initial returns, although it received strong support in explaining the long-term performance. This can be interpreted as markets' inefficiency: underwriters were more aware of the general conditions and future performance of companies, presumably behaving rationally; however, this was not reflected to the initial trading. If individual investors would act rationally and base their investment decisions on facts and rationales, should not this be seen during the first trading days as well? Perhaps it could be captured during the first trading days, however in that era the IPO pricing was based on the P/E ratios, and if general market trades at around 35 and the issue starts at 15, the underwriter reputation is not very useful attribute for investors who are looking for short-term profits. Hence, speculation and fads indeed exist among Chinese IPOs.

However, the phenomenon of poor long-term performance has weakened during the development of Chinese IPO markets. This development also reflects the increased

market efficiency, even on some level, and as presented in previous chapters, there has been several reformations in regulations affecting on IPOs. Therefore, it is not surprising that the results are contradictorily and confusing.

7. DATA AND METHODOLOGY

7.1. Data

The Data for the study are extracted from Thomson Reuters Datastream covering 131 IPOs issued during 2010–2012, accounting for 12,04 % of all IPOs issued during the period. The significant lack of data from P/E ratios and other variables caused the contraction in the sample size. The data are not normally distributed, neither between years nor between stock exchanges, therefore the more accurate examination is not possible, since the results might get distorted. Table below exhibits the distribution of IPOs in this sample. As the most important note from the table is the quantity of issues in each year. Even though the markets were steadily but slowly plunging, there still were relatively similar quantity of issues issued to the markets. Hence, it cannot be argued that the companies or underwriters would have been pursuing to take advantage of market conditions, as the markets were "cold", already suggesting that fads, speculation and overoptimismn are in greater role in this research period.

Table 3. Descriptive statistics for the distribution of IPOs.

	2010-2012	2010	2011	2012
All Issued IPOs	1088	377	369	343
IPOs excluded	957	307	337	314
All IPOs examined	131	70	32	29
In Shanghai	20	7	5	8
In Shenzhen	111	63	27	21

Concerning on the descriptive statistics which are presented in table 4, the average first day P/E ratio of IPOs has decreased significantly during the research period, as it offers a rough view of the valuation of companies. From 2010 to 2012 those decreased by half, indicating about economic environment. During 2010 the economy in China was growing steadily after financial crisis, and the views of economy drove stock prices up. From the early 2011 the path has been opposite, the stock indices had started to slip, which is reflected to the IPO prices too, causing them to decrease since the uncertainty increased. An alternative explanation for the variance of P/E ratios is the deregulation of pricing

rule. Companies and underwriters were for the first time able to price issues as they wanted. As a result, the average primary market P/E ratio jumped nearly ten times. The ROA ratios (pre-issuing year) are consistent with P/E ratios, since 2010 those have decreased also. The largest difference is in issue sizes, from 2011 to 2012 the average issue size dropped more than 50 %, although the sample sizes between years 2010 and 2011 differ remarkably, hence the difference might be a result of not normally distributed data. M/B ratios from the trading day are also consistent with other figures, indicating about the worse economic views, as the market valuation has slipped in comparison to book value.

Table 4. Descriptive statistics for P/E, ROA, SIZE & M/B ratios.

	2010-2012	2010	2011	2012
Mean P/E	120.61	128.47	154.40	64.38
Mean ROA %	3.73 %	4.20 %	3.25 %	3.13 %
Mean Size CNY Million	1104.00	1182.92	1360.09	630.93
Mean M/B	3.73	4.20	3.25	3.13

7.2. Methodology

This study applies the most commonly used methodology in long-term performance measures, by pursuing to be consistent with Ritter (1991) and Loughran & Ritter (1995). Examination of long-term performance is proceeded over four different time intervals and calculated for each initial public offering: 6-month holding period returns, 12-month holding period returns, 24-month holding period returns and 36-month holding period returns. Afterwards the wealth relatives for each initial public offering are calculated.

Initial returns, abnormal returns, holding period returns and wealth relatives

The raw initial return of a given company is generally defined as the relative difference in price between the first trading day close price and issue price. The raw initial returns are calculated by applying the formula below:

(8) $$IR_i = \frac{P_{i1} - P_{i0}}{P_{i0}}$$

where IR_i = raw initial return of stock i
P_{i1} = first day close price of stock i
P_{i0} = price of stock i at initial offer

The abnormal returns of initial public offerings are defined as the difference between stock performance and benchmark performance. This study applies the market-adjusted returns, which are calculated as:

(9) $$MAIR_i = \frac{P_{i1} - P_{i0}}{P_{i0}} - \frac{I_1 - I_0}{I_0} = IR_i - R_m$$

where $MAIR_i$ = market-adjusted initial return of stock i
P_{i1} = first day close price of stock i
P_{i0} = price of stock i at initial offer
I_1 = index value of the Shanghai/Shenzhen SSE Composite Index at the first trading day
I_0 = index value of the Shanghai/Shenzhen SSE Composite Index at the offering date
IR_i = raw initial return of stock i
R_m = return of market index i

The mean abnormal return of a portfolio containing n IPO stocks is defined to be the equally-weighted arithmetic average of abnormal returns, in this study the average of market-adjusted returns:

(10) $$AR = \frac{1}{n}\sum_{i=1}^{n} MAIR_i$$

where AR = average abnormal return
$MAIR_i$ = market-adjusted return of stock i
n = the quantity of stocks in the portfolio

In order to test the statistical significance of market-adjusted initial returns, the Student's *t*-test is applied by using the equation below:

(11) $$t = \frac{AR}{s/\sqrt{n}}$$

where AR = average abnormal return
s = standard deviation of market-adjusted initial returns
n = number of observations in the sample
t = Student's t-test value

The null hypothesis assumes that the average abnormal returns will not significantly differ from zero, consequently the initial public offerings are not significantly underpriced.

$H_0: AR = 0$

The long-term performance of IPOs can be measured by comparing the holding period returns to the market returns during the same time periods, as the holding period return measures the total returns of a stock with buy-and-hold strategy when the IPO stock is bought at time t and held for T months. A wealth relative of greater than 1.00 indicates that the company outperforms its benchmark, which in this study is either the Shenzhen SSE Composite Index or Shanghai SSE Composite Index, depending on the issuing exchange. Correspondingly, a wealth relative of less than 1.00 can be interpreted as IPO underperforming its benchmark. This study excludes the initial returns from the examination of wealth relatives, and is consistent with the methodology Ritter (1991) applied. Holding period return for stock when held for T months and excluding initial

return is calculated in the first equation below, as the second calculates wealth relatives for IPO firm by following way:

(12) $$R_i = \prod_{t=1}^{T}(1 + r_{it}) - 1$$

where: R_i = total return of stock i
r_{it} = raw return of stock at time t

(13) $$WR_i = \frac{\prod_{t=1}^{T}(1 + r_{it})}{\prod_{t=1}^{T}(1 + r_{mt})}$$

where WR_i = wealth relative for stock i
r_{it} = raw return of stock i at time t
r_{mt} = market return at time t

The method of excluding initial returns from the long-term performance was chosen since this study observes two anomalies: initial underpricing and long-term performance. Hence, it is more relevant approach to split the time period to two non-overlapping time period. As commonly known, the second day returns are far more insignificant than first day returns. The results might also be biased if the holding period returns would include initial returns, since the market-adjusted initial returns are one of the key independent variables in the cross-sectional regressions.

Cross-sectional regression analysis

The cross-sectional analysis is used for finding the significance of five applied independent variables, for the dependent variable, which is the market-adjusted holding period return of 6-, 12-, 24- & 36-month, by applying the OLS multivariate regression model. The independent variables are firm specific characteristics, consisting of market-adjusted initial return, price-to-earnings ratio, logarithmic value of size of the issuance, return on assets and market-to-book ratio. Additionally, two non-firm specific dummy variables are used: first for the listing stock exchange and the second for the issuing years.

Variables, both independent and dependent were chosen based on the previous empirical studies and changes in the regulations and issuing environment.

Price-to-earnings ratio as independent variable is one of the main objectives of this study. As mentioned in previous chapters and introduction, the CSRC used to control the price of IPOs in the primary market by setting a price ceiling based on the P/E ratio, which was not allowed to exceed 15. The CSRC deregulated this rule in June 2009 and afterwards the pricing of IPOs has been floating. Due to these changes in the regulation, it is ideal to examine whether primary market P/E ratio has a significant relation with long-term performance of IPO firms. There were not ready data about the primary market P/E ratios in the Thomson Reuters Datastream, instead P/E ratios based on the first day close price. Before completing the regressions, the P/E ratios were transformed on primary market level by defining the earnings from the relation of given ratios and first day close price. Afterwards, the issue prices were divided with earnings in order to get the primary market P/E ratio. This study decided to apply the primary market P/E ratio, since the price is not yet "discounted by markets", as it is given to markets. Hence, I expect there to be strong relationship between the long-term performance and P/E ratios, since the pricing is no more regulated. Theoretically, if the pricing of IPOs in China would be efficient, there should not exist any relations, since underwriters would price the issues on reasonable levels. However, as previous studies have shown, the initial returns in China are enormous, and fads also exist, which are supported by CSRC since it regulates the timing of IPOs, I assume the underwriters and companies are willing to take advantage of the opportunity to price issues as they see the best. The relation between long-term performance and underwriter reputation was documented by Su & Bangassa (2011b), thus increasing the probability that P/E ratios can indicate about the aftermarket performance.

The size of the issuance has been used virtually in all previous studies. Because of the possible existence of fads among small IPOs, those might experience greater initial returns, which on average have had strong negative relationship with the long-term performance. Larger IPOs usually attain more attention at the market, and their pricing is more efficient. Therefore, this study focuses on the size of the issuance and on the market-adjusted initial returns. Previous studies have also documented positive relationship between size and long-term performance: relatively bigger IPOs have had better long-

term performance as the smaller ones have had significantly weaker performance. Due to the skewness in data, the size of the issuance is transformed into a logarithmic form, in order to receive more robust results.

ROA (return on assets) is applied as independent variable in order to account for the profitability of companies. Profitability is one of the key determinants in the prestigiousness and in the pricing of companies. From all different measures of profitability, ROA is the most suitable for this purpose, since it focuses on both: debt and equity, and it gives larger view of the total performance of companies. Equity/debt ratios may vary over the time when companies complete SEOs or raise more debt, hence ROA serves this purpose the best when the long-term performance is under examination. The most recent pre-issue ROA ratios of IPO companies are used to test if there is a relationship between the pre-issue profitability and long-term performance.

M/B ratio (market-to-book) gives another kind of view about the valuation of companies, by focusing on the relative differences between book and market value, as P/E ratio accounts for the market value and earnings. The differences between these two ratios might differ meaningfully and therefore both are examined. M/B ratio of a given company is based on the first trading day close price in this regression. If companies with high M/B ratio perform worse in the long-term, it gives a sign about the fads or overoptimismn related to the IPOs.

Dummy variables are created for distinguishing the differences between listing stock exchanges and issuing years. SSH dummy variable accounts for the issuing stock exchange, by receiving a figure of one if the company is issued in Shenzhen stock exchange, and zero if issued in Shanghai. The distribution of IPOs between these two stock exchanges is meaningful, and the quantity of IPOs issued in Shanghai is too low for completing regressions in different samples since the preconditions for accurate regression analysis are not fulfilled. Therefore, the study applies dummy variable for the difference in stock exchanges. YEAR dummy variable captures the differences in issuing years, if issued in 2010 or 2011 the dummy receives a value of zero and if in 2012, it receives a value of one. The direction of both indices has steadily and slowly headed downwards since 2010, however, when the attention is on the long-term performance of IPOs (36 months), the long-term performance of IPOs issued in 2012 might bias the

results upwards due to the rapid and strong growth in indices in mid-2014. Hence, the dummy pursues more accurate results by controlling the market conditions.

Following regressions are examined with a null hypothesis that the there is no statistically significant relationship between the independent variables and the dependent variable. Due to the strong correlation between MAIR, P/E and MB ratios, those are not included to same model in order to avoid multicollinearity and biased results. Regression results and correlation matrix are presented in the next chapter.

(14) $$AR_t = \alpha + \beta_1 MAIR + \beta_2 SSH + \beta_3 YEAR + \varepsilon$$

(15) $$AR_t = \alpha + \beta_1 P/E + \beta_2 SSH + \beta_3 YEAR + \varepsilon$$

(16) $$AR_t = \alpha + \beta_1 LNSIZE + \beta_2 SSH + \beta_3 YEAR + \varepsilon$$

(17) $$AR_t = \alpha + \beta_1 ROA + \beta_2 SSH + \beta_3 YEAR + \varepsilon$$

(18) $$AR_t = \alpha + \beta_1 MB + \beta_2 SSH + \beta_3 YEAR + \varepsilon$$

(19) $$AR_t = \alpha + \beta_1 MAIR + \beta_2 LNSIZE + \beta_3 ROA + \beta_4 SSH + \beta_5 YEAR + \varepsilon$$

(20) $$AR_t = \alpha + \beta_1 P/E + \beta_2 LNSIZE + \beta_3 ROA + \beta_4 MB + \beta_5 SSH + \beta_6 YEAR + \varepsilon$$

where
AR_t = abnormal (market-adjusted) 6-, 12-, 24- or 36-month holding period return
$MAIR$ = market-adjusted initial return
P/E = first day price-to-earnings ratio
$LNSIZE$ = logarithmic size of the issuance
ROA = return on assets ratio in the issuing year (pre-issue)
MB = market-to-book ratio on the issuing day
SSH = dummy variable for stock exchanges, receives a figure of 1 if issued in Shenzhen and 0 if in Shanghai
$YEAR$ = dummy variable for issuing years, receives a figure of 1 if issued in 2012 and 0 if in 2010–2011

Alternative approaches to the long-term performance of IPOs

There are various methods to determine the long-term performance of IPO companies, however most of them apply either the buy-and-hold period returns or wealth relatives. Greatest differences in the models are results of different benchmarks, or applications of portfolios. The long-term performance of an IPO firm is determined based on its benchmark, and depending on the study the benchmarks vary. The figure below gives a perfect example about the significance of benchmark. One may indicate that the long-term performance is great, as another may claim it to be substantially weak.

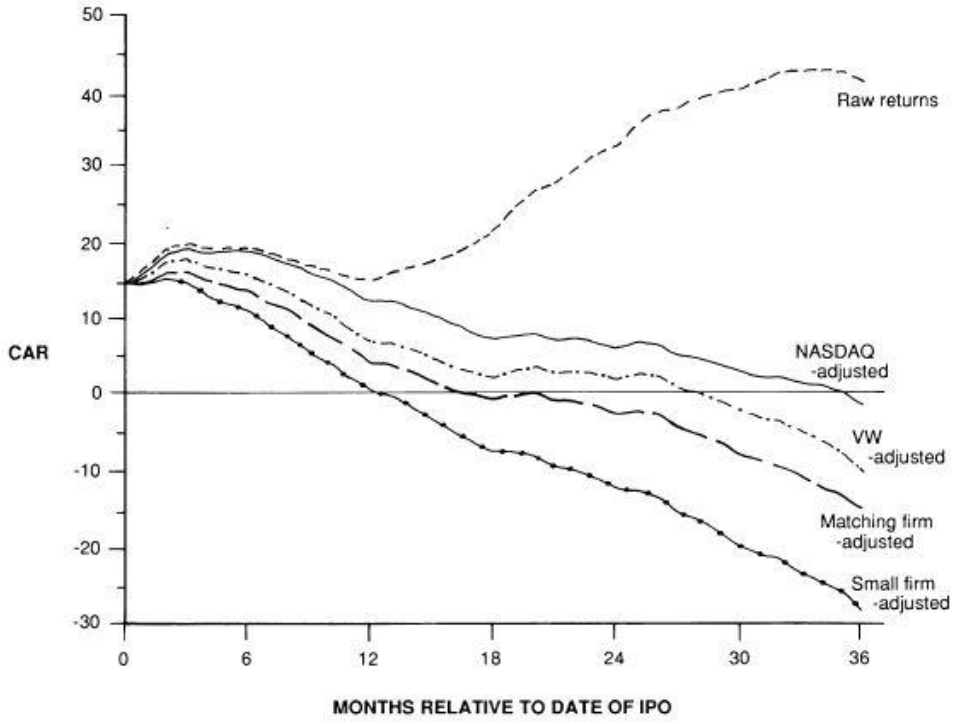

Figure 4.) Cumulative average adjusted returns for an equally-weighted portfolio of 1526 IPOs issued in U.S. between 1975 and 1984, with monthly rebalancing (Ritter 1991: 11).

Depending on the case the most suitable benchmark also varies. In general, adjusting the returns of IPO companies to whole market's return can be considered as inaccurate, due to the differences. The whole market's beta is one, and usually IPOs contain more risk and are more volatile, beta exceeding one. The entire market composes from all kinds of firms from different industries and from different sizes. Is it relevant benchmark? Yes and no. The results are not the most accurate, however those are able to give a rough view

about the performance. On the other hand, if the benchmark portfolio composes from a small group of accurately matching firms, it is more sensitive to the performance of one company. This might or might not influence biased results, since the sample is meaningfully smaller. Hence, the application of more accurate model requires the markets to be more efficient. If the markets are not enough of efficient, the pricing of IPOs on the secondary market presumably differs from the pricing of already exiting and matching firms. With the possible existence of fads in the markets, the determination of relevant benchmark becomes trickier.

As discussed in the previous chapter, China's domestic IPO markets cannot be considered to be highly efficient. Individual investors do not possess access to the information, instead their actions are irrational and depending on the market conditions, bullish or bearish. Behavior and sentiment play key roles among underpricing of IPOs, therefore, I consider the application of market indices to be adequate benchmark as a first step for determining the long-term performances of Chinese IPOs.

8. EMPIRICAL RESULTS

8.1. Initial returns

The first glimpse on the results of initial returns reveals unexpected figures. The underpricing phenomenon has been significant issue over the time, hence strongly negative results seem dubious. Both classes, raw return and market-adjusted initial return states the high negative initial returns do not exist anymore.

Table 5. Descriptive statistics for RAW IR and MAIR.

	2010-2012	2010	2011	2012
Mean RAW IR %	-47.08 %	-43.90 %	-60.43 %	-40.04 %
(t-value)	(-13,87***)	(-9,69***)	(-9,96***)	(-5,19***)
Mean MAIR %	-46,49 %	-42,69 %	-60,03 %	-40,71 %
(t-value)	(-13,53***)	(-9,01***)	(-9,86***)	(-5,46***)
Median RAW IR %	-55.43 %	-54.15 %	-67.51 %	-53.13 %
Median MAIR %	-56.06 %	-52.58 %	-71,28 %	-51.82 %

* statistically significant at 0,10 level
** statistically significant at 0,05 level
*** statistically significant at 0,01 level

More accurate comparison between already conducted studies reveals that the results are extremely contaminated. Song et al. (2014) included substantially more companies to their sample, receiving highly contradictory results compared to these. The sample contained 336 IPOs issued in 2010 and 275 IPOs issued in 2011 (nearly all issued IPOs), as the corresponding quantities in this study are 70 and 32. However, the study completed by Song et al. does not have results about the IPOs issued in 2012, and hereby the robustness of the results is incomparable. The figure on the next page shows the level of initial returns in their study, the complete bar accounts for the level of initial returns. As it shows, the initial returns weakened meaningfully from 2010 to 2011, and the results of this study are in line as well, since the initial returns surged even more. Due to the contradiction, observing the statistical significance of the results of this study is irrelevant.

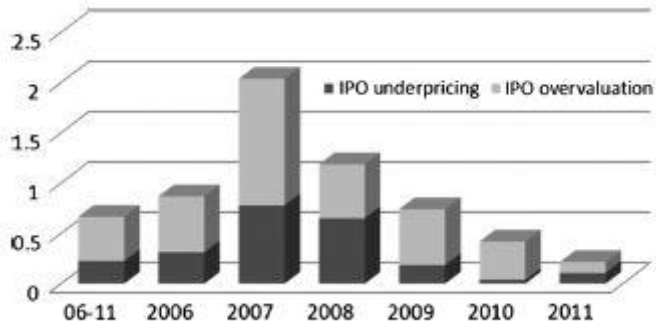

Figure 5.) IPO underpricing and IPO overvaluation during 2006–2011 Song, Tan & Yi (2014: 43).

In these circumstances, the evaluation of initial returns cannot be completed enough of accurately with a sample covering only 12,04 % of issued IPOs. More comprehensive data sample is required in order to receive robust results, and this sample accounts for all data available from Thomson Reuters Datastream. When the market-adjusted initial returns were observed, only 18 IPOs experienced positive returns, as the rest, 113 experienced negative returns. As a conclusion, these results should not be trusted.

Findings about the underpricing of IPOs based on this study suggests that IPOs have not been statistically underpriced during 2010–2012, and during this era there was no clear path about the level of underpricing. However, as I already confirmed, these results cannot be trusted since the sample is so small and the more comprehensive study by Song et al. (2014) clarified that during 2010 and 2011 IPOs were significantly underpriced, though their level of underpricing weakened substantially between 2010 and 2011. Consequently, based on this study, I am not able to reject or confirm the first two hypotheses. Sample is too small in order to receive accurate and truthful results.

8.2. Long-term performance

The long-term performance of the IPOs examined in this study is first observed with the market-adjusted holding period returns, while the initial returns are excluded. During the first year, the initial public offerings have not been good investments in China as those underperformed the markets throughout the sample. IPOs issued in 2010 seem to be overpriced the in primary sales or on the first trading day, as those did not start to perform better even after 3 years. However, the IPOs issued in 2011 and 2012 started to perform better after one year, and eventually surging during the third year. Examination of the arithmetic means of the entire sample is irrelevant due to the general surge of indices in China as the results are probably biased. However, when IPOs are issued in stable market conditions, as in 2010, those are lousy long-term investments in China, at least with this sample. Results are presented in table 6.

Table 6. Descriptive statistics of 6-, 12-, 24- & 36-month market-adjusted holding period returns.

	2010-2012	2010	2011	2012
Mean MAHPR 6 Months %	-5.80 %	-5.39 %	-4.98 %	-7.71 %
(t-value)	(-2,76***)	(-1,54)	(-2,23**)	(-2,19**)
Mean MAHPR 12 Months %	-9.20 %	-9.68 %	-6.97 %	-10.49 %
(t-value)	(-3,53***)	(-2,37**)	(-1,63)	(-2,48**)
Mean MAHPR 24 Months %	0.82 %	-9.93 %	-5.63 %	33.86 %
(t-value)	(0,19)	(-2,59**)	(-0,89)	(-2,38**)
Mean MAHPR 36 Months %	7.79 %	-9.83 %	12.74 %	44.84 %
(t-value)	(1,15)	(-1,73*)	(1,40)	(1,89*)
Median MAHPR 6 Months %	-10.48 %	-13.00 %	-4.98 %	-14.02 %
Median MAHPR 12 Months %	-15.66 %	-19.26 %	-11.20 %	-15.22 %
Median MAHPR 24 Months %	-11.28 %	-17.58 %	-15.40 %	13.57 %
Median MAHPR 36 Months %	-15.64 %	-21.94 %	-8.15 %	4.19 %

* statistically significant at 0,10 level
** statistically significant at 0,05 level
*** statistically significant at 0,01 level

Median figures offer a better view to the reality than arithmetic means, since if the data sample is skewed with high outliers the results are easily biased. According to these

figures, the data are significantly skewed, since IPOs issued in 2011 no more produced positive returns, and the 2- and 3-year market-adjusted holding period returns of IPOs issued in 2012 were substantially lower. If chronologically examined, the long-term performance seems to improve year by year, eventually turning positive.

Table 7. Wealth relatives of Chinese IPOs.

	2010-2012	2010	2011	2012
6-Month	0.94	0.95	0.95	0.92
12-Month	0.91	0.91	0.91	0.90
24-Month	1.01	0.88	0.93	1.31
36-Month	1.07	0.88	1.15	1.24

The alternative way of presenting the long-term performance is the wealth relatives, which are presented in table above (7). As expected, the results of 6- and 12-month holding period are in line with previous ones. Suspiciously, the 3-year holding period return of IPOs issued in 2011, and 2- and 3-year holding period return of IPOs issued in 2012 were the only wealth relatives exceeding one. The big underlying question is that for how much of the surge do the market conditions account for? As the figure 6 on the next page shows, the indices surged significantly as of mid-2014, which may have caused investor sentiment to be on a high level, increasing the bullish behavior of investors. However, SSH & SSE composite indices account for all A-series stocks in the exchange, based on their market value. This set of IPOs issued during 2011 and 2012 outperformed the markets substantially, which suggests them to be more sensitive to market changes, in other words, their beta exceeds one significantly. This rationale supports my previous consideration that the market-adjusted holding period returns are not the most reliable in terms of measuring long-term performance.

However, based on these results, it cannot be robustly concluded if IPOs were profitable long-term investments, since the market conditions might have affected strongly on the performance of IPOs. After examining the cross-sectional results, I suggest improvements for subsequent studies in order to receive more accurate results in measuring the long-term performance of IPOs in China.

Figure 6.) Shanghai & Shenzhen Composite Indices chart. Shanghai denoted with orange color, Shenzhen with blue. (Bloomberg 2016).

8.3. Cross-sectional results

Table 8 presents the Pearson correlation coefficients between explanatory variables. Market-adjusted initial returns have strong negative correlation with price-to-earnings ratio and strong positive correlation with market-to-book ratio. This might cause multicollinearity in the regression results, otherwise all variables are eligible for completing the regression analysis. Due to these limitations, we cannot include all variables into a single model.

Table 8. Pearson correlation coefficients for independent variables.

	Mair	*P/E*	*LnSize*	*ROA*	*M/B*
Mair	1.00	-0.5886***	0.0119	-0.1644*	0.3708***
P/E	-0.5886***	1.00	0.0304	0.0105	-0.0458
LnSize	0.0119	0.0304	1.00	0.1283	-0.0158
ROA	-0.1644*	0.0105	0.1283	1.00	-0.0473
M/B	0.3708***	-0.0458	-0.0158	-0.0473	1.00

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

On a 6-month holding period, positive and high market-adjusted holding period returns indicate poor and significant long-term performance for an IPO. This supports the general theory that strong positive initial returns are a result of speculation and high expectations, and on longer term markets notice the companies are not as valuable as expected.

However, the results are contradictory with study from Song et al. (2014), which was unable to find a relation during shorter holding period, instead the relation was significant only after one year. The second finding is more interesting, P/E ratios have extremely significant and positive relationship with the 6-month holding period return, and the highest explanatory power. At first, one could assume the high P/E ratios indicate the offerings to be overpriced, as those probably were as well. This rationale would also suggest the long-term performance should be weak (similarly as with market-adjusted initial returns). Even the "hot market" conditions cannot explain this relationship, since the stock indices plunged steadily before the peak of 2014, while the range of this regression reaches only mid-2013. Hence, it might be that the investors' excess expectations are not completely faded after 6 months of holding. The M/B ratios have strong negative relationship also, being in support of theory that low M/B ratios indicate better long-term performance, revealing that the level of pricing is an important factor. As a reminder, the applied M/B ratio is the M/B ratio in the end of the first trading day, hence the negative initial returns have already discounted this factor and therefore these results can be considered obvious. Returns on assets received only moderate statistical support that the more profitable companies perform better during the first 6 months. Fads and speculation around the IPOs might have disturbed the efficient pricing of stocks, as the performance of recently issued IPOs can be better explained with other variables, hence the statistical significance is only moderate. Surprisingly, the size of the issuance received no support as in most markets there is a negative but significant relationship. On a 6-month holding period there were no statistically significant differences between the stock exchanges or issuing years.

Table 9. OLS Regression results of 6-month market-adjusted holding period return as the dependent variable. Individual independent variables with SSH & YEAR dummy.

	Coeff. (t-value)					R-square
Intercept	-8.434 (-1.48)	-13.619 (-2.40**)	-106.09 (-1.23)	-14.853 (-2.19**)	8.748 (1.05)	
SSH	-4.959 (-0.76)	-3.811 (-0.64)	7.362 (1.03)	2.289 (0.39)	2.221 (0.38)	
YEAR	-2.073 (-0.41)	3.140 (0.62)	1.451 (0.24)	-3.701 (-0.71)	-5.237 (-1.00)	
MAIR	-0.157 (-2.65***)					0.0557
P/E		0.085 (4.03***)				0.1167
LNSIZE			4.564 (1.15)			0.0139
ROA				0.860 (1.95*)		0.0326
M/B					-4.096 (-2.72***)	0.0587

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

When the holding period is increased by 6 more months (12 months in total) the importance of variables starts to change. Market-adjusted initial returns and P/E ratios both are still significant, though started to decrease slightly as their explanatory power weakens also. Instead, M/B ratio and return on assets have become more important with higher significance and greater coefficients, offering increased explanatory power. This might describe that markets are giving more value to fundamental capabilities on longer run, and the explanatory power of different variables is time-dependent. When the speculation and fads starts to fall, valuation of companies is more likely based on their profitability and chances to grow, hence companies with reasonable level of valuation (M/B) and better profitability are generating better returns in the future. The size of the issuance gained some statistical significance, although not reaching even the level of 10 % statistical significance. Despite the extended observation period, the differences between stock exchanges and issuing years remained relatively similar – as insignificant.

Table 10. OLS Regression results of 12-month market-adjusted holding period return as the dependent variable. Individual independent variables with SSH & YEAR dummy.

	Coeff. (t-value)					R-square
Intercept	-9.819 (-1.38)	-15.523 (-2.17**)	-153.06 (-1.44)	-20.479 (-2.45**)	14.869 (1.45)	
SSH	-8.648 (-1.05)	-7.085 (-0.95)	6.851 (0.77)	-0.675 (-0.09)	-0.666 (-0.09)	
YEAR	-1.696 (-0.26)	4.064 (0.64)	3.438 (0.46)	-4.368 (-0.68)	-6.301 (-0.98)	
MAIR	-0.179 (-2.42**)					0.0446
P/E		0.094 (3.53***)				0.0901
LNSIZE			6.685 (1.35)			0.0148
ROA				1.390 (-2.45**)		0.0497
M/B					-5.929 (-3.21***)	0.0754

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

On a 2-year holding period all independent variables except size are statistically significant, at least on 5 % level. The significance of market-adjusted initial returns and P/E ratios rose substantially and their explanatory power increased more than trice (similar findings as Song, Tan & Yi 2014 received), as the significance of ROA and M/B ratios decreased, however all of them still being very significant. The dummy could not account for any meaningful differences between stock exchanges, even though the holding period was twice longer in this regression. Interestingly, the size of the issuance did not gain any significance but the dummy variable accounting for issuing years received very strong statistical significance suggesting the issuing year to be highly significant. Contradictorily, these findings about the size are not in line with results offered by Su and Bangassa (2011b), who also found that larger size of an IPO indicated better aftermarket performance during 2001–2006. Size of the issuance has received rather robust and similar results in earlier studies in all markets, Aggarwal and Rivoli

(1990) & Ritter (1991) found that weaker long-term performance is more severe problem among smaller companies, as both examined U.S. IPOs, as did Cai and Wei (1997) with Japanese IPOs.

Table 11. OLS Regression results of 24-month market-adjusted holding period return as the dependent variable. Individual independent variables with SSH & YEAR dummy.

	Coeff. (t-value)					R-square
Intercept	-23.267 (-2.16**)	-35.067 (-3.30***)	30.166 (0.18)	-38.162 (-2.94***)	1.604 (0.09)	
SSH	-4.716 (-0.37)	-0.509 (-0.04)	12.629 (0.91)	13.488 (1.19)	13.981 (1.22)	
YEAR	44.598 (4.65***)	56.599 (5.96***)	42.986 (3.71***)	40.810 (4.09***)	40.227 (3.96***)	
MAIR	-0.391 (-3.49***)					0.2128
P/E		0.197 (4.94***)				0.2763
LNSIZE			-2.413 (-0.31)			0.1377
ROA				2.008 (2.381**)		0.1739
M/B					-5.776 (-1.96**)	0.1626

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

Due to this dubious contradiction regarding to the size of the issuance, I ran the regressions without YEAR-dummy, and the results indicated that bigger IPOs performed worse in the long-term than their smaller corresponding counterparts, with 5 % significance level. The interpretation of these contradictory results (no support for size, difference between issuing years, negative relationship if years are not controlled) can be explained. IPOs issued in 2012 experienced strong positive 2-year holding period returns, however, as the descriptive statistics already revealed, the average size of an IPO was almost half smaller as in previous years. Smaller companies also have higher beta and their stocks are more volatile than stocks of larger companies. The surge in 2014 and

small sample size distort these results, yet controlling the regression with issuing years captures the phenomena rather well. Despite that, the results about the size of an issuance cannot be considered completely robust. YEAR-dummy is extremely significant in each regression, with a positive relationship on long-term performance, suggesting that the market conditions highly affect on the performance of IPOs.

Table 12. OLS Regression results of 36-month market-adjusted holding period return as the dependent variable. Individual independent variables with SSH & YEAR dummy.

	Coeff. (t-value)					R-square
Intercept	-41.090 (-2.44**)	62.156 (-3.79***)	199.811 (0.76)	-49.126 (-2.35**)	-1.005 (-0.03)	
SSH	6.436 (0.33)	13.001 (0.76)	29.793 (1.37)	39.592 (2.16**)	38.960 (2.15**)	
YEAR	53.645 (3.57***)	74.991 (5.12***)	45.659 (2.49**)	51.419 (3.21***)	46.661 (2.91***)	
MAIR	-0.678 (-3.87***)					0.1954
P/E		0.351 (5.712***)				0.2844
LNSIZE			-11.071 (-0.91)			0.1064
ROA				1.299 (0.95)		0.107
M/B					-9.265 (-1.99**)	0.1279

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

Results on the 3-year holding period return are mostly in line with previous regressions about shorter holding periods. Throughout all regressions and variables, the only significant differences between exchanges are found when then 3-year holding period return is explained with the return on assets and market-to-book ratios, suggesting that it is more important factor in Shenzhen than in Shanghai. In all regressions the YEAR-dummy is still highly significant, even though those have fractionally weakened. This emphasizes that year of issuing (in this study pursues to capture the market conditions)

has strong explanatory power, and the market conditions are well captured with the dummy, as the weakening of dummy is in line with weakening of wealth relatives (presented in table 7).

Main results from this holding period indicate the significance and explanatory power of market-adjusted initial returns and P/E ratios rose substantially during the last year. Theory and rationale consider the future uncertainty to be increased as the time period is extended, consequently these hikes cannot be interpreted unambiguously. Being consistent with theory, the statistical significance of return on assets and M/B ratios decreased, and the first one lost its significance completely. After the results of 2-year holding period return, it is not surprising that the slope coefficient and significance of the size rose, as the time period is longer and accounts for more of the markets' surge, however still not receiving any statistical support.

When the explanatory power, significance and slope coefficients of independent variables are compared during different holding periods, the figures are mostly confusing and irrational. When the holding period is short, the explanatory power and significance are substantially weaker than in longer periods. As previously mentioned, forecasting and predicting aftermarket performance should get harder and more inaccurate when the time period is longer. On the other hand, as fads hypothesis suggests, in the short run the pricing of stocks is inefficient due to the existence of speculative and irrationally behaving investors. Hence, investors act irrationally and forecasting prices with linear model is inaccurate. As the fads among recently issued IPOs weaken, and the behavior of investors becomes more rational, the model gains power again.

Due to the similar results in each era, I conclude the market-adjusted initial returns, M/B ratios and pre-issue P/E ratios to be the best predictors for the long-term performance. These all can be considered as proxies for the valuation of stock, hence the level of valuation seems to account the most in the short- and long-term. The strongest support was received by P/E ratio, indicating that as called "growth stocks" performed the best, in every era. However, these results can only be considered as directional due to the small sample size and market conditions, as it also needs to be remembered that only 18 of these 131 issued IPOs experienced positive market-adjusted initial returns, results being strongly contradictory with more comprehensive studies.

Table 13. OLS Regression results of 6-month market-adjusted holding period return as the dependent variable.

	Coeff.	t-value	Coeff.	t-value
Intercept	-23.368	-0.26	-7.012	-0.08
LNSIZE	0.443	0.106	0.075	0.01
ROA	0.667	1.46	0.775	1.81*
MAIR	-0.139	-2.25**		
SSH	-4.134	-0.50	-4.313	-0.61
YEAR	-3.058	-0.49	-1.546	-0.25
P/E			0.078	3.73***
M/B			-3.468	-2.39**
R-square		0.0734		0.1796

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

As the correlation matrix revealed, some of the independent variables have high correlation which might cause multicollinearity in results, I constructed two alternative models explaining the long-term performance.

The first model explaining the 6-month holding period returns has relatively low explanatory power, barely exceeding 7 %. Neither the size of the issuance nor the return on assets were able to explain the performance, as only market-adjusted initial returns were statistically significant at 5 % level and supporting the theory that high initial returns indicate worse aftermarket performance. The alternative model, which does not account for the market-adjusted initial returns has substantially better explanatory power (over 10 %), as it also has one independent variable more. Price-to-earnings ratio was able to explain the 6-month performance at 1 % level, as M/B ratio had also good explanatory power, while the return on assets had only moderate capability in explaining the long-term performance. Neither of the models were able to capture differences between issuing years nor stock exchanges.

Table 14. OLS Regression results of 12-month market-adjusted holding period return as the dependent variable.

	Coeff.	t-value	Coeff.	t-value
Intercept	-45.034	-0.41	-6.481	-0.06
LNSIZE	1.200	0.23	0.113	0.02
ROA	1.165	2.07**	1.295	2.45**
MAIR	-0.146	-1.91*		
SSH	-6.707	-0.66	-7.915	-0.91
YEAR	-3.093	-0.41	-3.288	-0.43
P/E			0.083	3.21***
M/B			-5.246	-2.94***
R-square		0.0804		0.1914

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

According to the correlation matrix, there is statistically a small correlation between market-adjusted initial returns and return on assets ratios. In the previous regression it did not disturb the model, as in this, the market-adjusted initial returns lose significance substantially, as return on assets gain. Otherwise the results are similar with earlier models, with the explanatory power of model being slightly better. As in with 6-month holding period return, the subsequent model is again better and more accurate in explaining the performance. P/E ratios and M/B ratios are highly significant at 1 % level. Return on assets is significant in both models at 5 % level, however in neither of the models, the size, issuing years and issuing exchange were significant.

Even though in both models and in both time periods the marked-adjusted initial returns, P/E ratios, and M/B ratios are greatly significant in explaining the current aftermarket performance, the slope coefficients are low. For example, even if the P/E ratio of an issuing company would be 100, its effect on 12-month performance would be only 8 %. Correspondingly, the slope coefficient of -5,2 for M/B ratios is small, since the variety of M/B ratios is also small, as in with market-adjusted initial returns. Hence, the results confirm that these variables in general have a strong probability in affecting on the long-term performance, however the effects themselves are not substantial.

Table 15. OLS Regression results of 24-month market-adjusted holding period return as the dependent variable.

	Coeff.	t-value	Coeff.	t-value
Intercept	270.66	1.64	242.44	1.55
LNSIZE	-14.390	-1.86*	-12.759	-1.77*
ROA	1.939	2.29**	2.215	2.78***
MAIR	-0.404	-3.35***		
SSH	-20.805	-1.37	-14.829	-1.13
YEAR	29.884	2.62***	38.133	3.35***
P/E			0.189	4.87***
M/B			-5.032	-1.87*
R-square		0.2551		0.3375

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

Observing the results of 24-month holding period returns reveals the previously discussed problem. When more variables were included to the model, the size of the issuance receives unreliable results, as the YEAR dummy in no more able to capture the market conditions. Hence, both models falsely signal the bigger IPOs experience worse aftermarket performance than smaller ones. Significance of return on assets is greater in both models, than in single model where it was only moderately significant, and depending on the model its significance is either at 5 % level, or at 1 % level. There is a high probability that multicollinearity or market conditions disturb the ratios in the first model, since the coefficients and significances of YEAR dummy have weakened meaningfully in both models. Increased explanatory power in both models, as well as increases in coefficients and t-values of P/E ratios, and in market-adjusted initial returns suggest there exists fads during longer time periods as well.

Table 16. OLS Regression results of 36-month market-adjusted holding period return as the dependent variable.

	Coeff.	t-value	Coeff.	t-value
Intercept	541.25	2.08**	465.40	1.91*
LNSIZE	-27.513	-2.26**	-23.621	-2.09**
ROA	1.180	0.88	1.692	1.35
MAIR	-0.763	-4.22***		
SSH	-25.466	-1.06	-12.121	-0.59
YEAR	30.510	1.69*	47.107	2.64***
P/E			0.344	5.66***
M/B			-8.011	-1.90*
R-square		0.2278		0.3259

* statistically significant at 0.10 level
** statistically significant at 0.05 level
*** statistically significant at 0.01 level

Examining the 3-year aftermarket performance supports previous findings about biased results in the size of the issuance. In both models its significance is on higher level and the coefficients doubled. Unexpectedly, in the first model the issuing year has a rather weak explanatory power, and in the other the issuing year is still very significant. Since there is no strong relationship in the first model, it can be concluded that the market-adjusted initial returns (level of pricing) have the best explanatory power in the 3-year holding period, despite the market conditions. The latter regression on the other hand strongly supports the market conditions to be important, and P/E ratios as well. Even on longer run, it seems the companies are experiencing rather similar long-term returns which are not dependable on the issuing stock exchange. These results also conclude that return on assets is insignificant in explaining 3-year aftermarket performance.

Based on analyzing all the data above, I confirm the third hypothesis. Chinese IPOs are poor long-term (3-year) investment. 85 of all 131 companies underperformed the benchmark, as only 47 outperformed it. 17 of these outperforming IPOs were issued in 2010, which also suggest that the market conditions are the most important factors in explaining the long-term performance of IPOs in China. However, even though the sample is small and only 18 companies generated positive market-adjusted initial returns

these results can be considered moderately robust. 113 companies had negative returns on the first trading day, and as all previous researches from 21st century and this confirms that there is strong negative relationship between first day returns and long-term performance. Even now when the sample is mostly full of companies with negative first day returns, which based on empirical researches should perform better in the long-term, they still underperform the markets. Consequently, if the sample would contain more companies, and as Song et al. (2014) already confirmed that the initial returns are positive with the entire sample, the average long-term performance of the entire set of companies should be even weaker.

Hypotheses four and five are both confirmed, in every time period the market-adjusted initial returns had statistically very strong negative relationship with long-term performance, however, its affects are not superior. This supports all theories that high initial returns indicate about the worse long-term performance and vice versa. Price-to-earnings ratio had statistically the strongest and positive relationship with long-term performance throughout all regressions and time periods, suggesting that the growth companies have higher probability to perform better in the long-term. Although, the coefficients of P/E ratios were rather small as well.

Market-to-book ratio has been statistically better in explaining the short-term performance, as its significance weakens in longer periods, though having higher explanatory power in longer periods. Return on assets' ability to indicate short- and long-term performance is only moderate, by being best in explaining the 1- and 2-year holding period returns, yet being unable to explain 6-month nor 36-month returns. Nevertheless, the dependency is positive and supports the existing theory and previous findings that more profitable companies have better performance. However, profitability is also time-dependent, previous success does not solely guarantee success in the future, therefore it loses it prediction power in the longer time period.

Size of the issuance received no statistical support. Previous researches from the globe consider the relatively larger size on an issuance will result better aftermarket performance in the long-term. However, with this sample of Chinese IPOs there was no statistical dependency between the size and aftermarket performance. Conducting the

research with more comprehensive set of companies might result in different kind of results, though with this small sample there was no dependency.

8.4. Limitations

As limitations, the market conditions made the measuring and defining of important determinants of long-term performance challenging. The rapid surge in mid-2014 disturbed measuring the general long-term performance of IPOs, as well as regressing the variables, resulting in biased figures regarding to the size of the issuance. The linear model is not the most accurate in defining the significance levels of variables in these circumstances, as more superior models are required for that purpose. Conducting the study with dataset covering only 12,04 % of issued companies might result more truthful results, if all variables are normally distributed. However, this study investigated all IPOs with data available from Thomson Reuters Datastream. There are some uncertainties related to most of the results since the data covered mostly IPOs with negative initial returns and the distribution of IPOs between issuing years far from normally distributed.

As second steps and improvements for further researches to be conducted in China's IPO markets I suggest and alternative method for defining the benchmarks. Since the level of efficiency of Chinese stock markets is continuously questioned, a model which accounts for this is required. As commonly known, the more traded the stocks are, the better is the efficiency of pricing. Thus, stocks which trading volumes are higher receive more attention at the markets. The more there are investors submitting quotes regarding to the stock, the more efficient the pricing is. Trading volumes are also a common measure of liquidity, and liquidity risk (premium) have been able to explain the variance of returns since the investors requires return for illiquidity (Liu 2006). Hence I consider the benchmark should be built from matching firms by applying the commonly known methods (assets, proxy for profitability, B/M, P/E, industry), and including a proxy for liquidity and efficiency. For each IPO in the sample, the should be an equally weighted portfolio of matching firms with monthly rebalancing. Small companies might face zero trading days, and correspondingly there might also be days when the stocks are heavily traded, therefore the most suitable proxy would be trading volume of one week divided

by five, simultaneously applying some kind of confidence intervals for the proxies. This would be more appropriate method for finding the matching firms, since there are not completely similar firms with all these features. With this approach, the long-term performance of an IPO company can be reasonably evaluated. As a result, there would be a portfolio of matching firms with relatively similar fundaments and which stocks are priced relatively similarly (efficiently of inefficiently, rough approach to trading volume and liquidity), thus the relevant benchmark is complete. Examining the long-term performance would not be so easily disturbed by market conditions since similar companies tend to have rather similar reactions regarding to market movements. However, researching the long-term performance would also require better proxies for market conditions, especially in volatile circumstances.

If conducted with multiple OLS regression, buy-and-hold period returns or wealth relatives could be still used as dependent variable, however the independent variables would be quite similar as in this study, except some of them would be representing differences. Independent variables would be: market-adjusted initial returns, delta ROA (difference between past and present, proxy for profitability), delta EPS (difference between past and present, proxy for earnings), proxy for investor sentiment (for example delta "Chinese VIX", difference between past 3 or 6 months to present), proxy for movements in market conditions (SHZE & SHSE difference between past 3 or 6 months to present), proxy for investor activity & hot market conditions (trading volume difference, between past 3 to 6 months to present, accounts for both Shanghai and Shenzhen exchanges) and the size of the issuance. Preferably, data would cover all issued A-series IPOs at least from 5 years, while the markets should be in a relatively steady conditions.

Although there is a question arising – is this just unnecessary datamining? With this portfolio of matching firms, data from different parts of the past and future are needed in order to evaluate the performance of IPO firms. After completing and analyzing all regressions, worthless variables should be excluded, stepwisely test alternatives and eventually construct a model which can be used for business purposes: for forecasting and predicting, not just for finding dependencies from the past and considering if IPOs have been underpriced and had poor long-term performance.

9. CONCLUSION

The purpose of this study is to examine the level of initial returns and long-term performance of Chinese A-series IPOs. The initial returns have historically been the highest in China's domestic stock markets, in comparison to all other markets. Even though previous researches show the level of initial returns has decreased over the time, the initial returns have still been substantial in the 21st century. Research data cover 131 initial public offerings issued in 2010–2012, accounting for total of 12,04 % of all issued initial public offerings. This research period was chosen due to the changes in regulatory environment, and as pursuing the most recent information from the long-term performance. Previously the pricing of initial public offerings was regulated with price-to-earnings ratio based ceiling, which did not allow the ratio to exceed 15. However, this was deregulated in June 2009, making the pricing floating. Hence, this is the first study which observes the long-term performance of issued initial public offerings only after the regulatory change.

The initial returns were calculated as the percentages changes from the primary market price to the first day close price, afterwards adjusted with market movements in order to test the statistical significance of these abnormal returns, which was tested with Student's t-test. The long-term performance and abnormal returns were defined as the market-adjusted buy-and-hold period returns of 6, 12, 24 and 36 months. The used benchmarks were SSH & SSE Composite indices, which account for all A-series stocks in either Shenzhen or Shanghai stock exchange, depending on the Index. The statistical significance of abnormal returns was tested with t-test. Regression analyses were used to test the statistical significance of firm specific characteristics and examine the cross-sectional patterns.

This study has five hypotheses. The first one assumes the level of initial returns is highly positive and significant, while the second states that the level of initial returns has weakened significantly during the research period. Due to the small research sample, resulting in biased results, I am not able to confirm or reject the two first hypotheses. Third hypothesis suggest that the Chinese initial public offerings are poor long-term investment, which is documented in this study and thus confirmed. Hypothesis four

assumes the market-adjusted initial returns have statistically strong and negative relationship between the long-term performance, as hypothesis five considers the price-to-earnings ratio has statistically strong relationship between the long-term performance. Both subsequent hypotheses are confirmed in this study, as the market-adjusted initial returns had statistically strong and negative relationship with the long-term performance, while the price-to-earnings ratio had statistically strong and positive relationship with the long-term performance. This suggests the initial public offerings with high market-adjusted initial returns had weaker long-term performance, as initial public offerings with high pre-issue price-to-earnings ratio were more likely to obtain better long-term performance.

Firm specific characteristics at the time of the issuance are able to explain the long-term performance, however, not comprehensively. Based on the research circumstances and the empirical results, the market conditions can be considered to be the most important factor over the others in explaining the aftermarket performance of Chinese initial public offerings. Further research with more accurate long-term performance measures, with more comprehensive sample is required in order to receive completely robust results.

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APPENDIX

The companies included into the research sample:

Company	Year	Company	Year
Anhui Xinhua Media Co Ltd	2010	Nanjing Sciyon Automation Grp	2010
Shenzhen Selen Sci & Tech Co	2010	Beijing Unistrong Science	2010
Haining China Leather Market	2010	Beijing Haohua Energy Resource	2010
Juli Sling Co Ltd	2010	Suzhou Dongshan Precision Mnfr	2010
Zhejiang Chint Electrics Co	2010	Shenzhen Sunyes Electn Mnfg	2010
Guangdong CHJ Industry Co Ltd	2010	Zhejiang Nanyang Technology co	2010
Shanghai Zhezhong Co Ltd	2010	Guizhou Xinbang Pharm Co Ltd	2010
Beijing Creative Distn	2010	Jiangsu Changqing Agrochemical	2010
Goldlok Toys Holdings Co Ltd	2010	Beijing Lier High Temperature	2010
China XD Electric Co Ltd	2010	Jiangsu Lianfa Textile Co Ltd	2010
Edifier Technology Co Ltd	2010	Hunan Mendale Hometextile Co	2010
Maanshan Dingtai Rare Earth	2010	Wuxi Double Elephant Micro	2010
China Erzhong Group(Deyang)	2010	Guangdong Advertising Co Ltd	2010
Shandong Xingmin Wheel Co ltd	2010	Xiamen Academy of Bldg	2010
Shenzhen Haoningda Meter Co	2010	Shenzhen H&T Intelligent	2010
Henan Senyuan Electric Co Ltd	2010	Zhejiang Aishida Electric Co	2010
Shandong Qixing Iron Tower	2010	Zhejiang Jiaxin Silk Corp Ltd	2010
Sichuan Fulin Transportation	2010	NavInfo Co Ltd	2010
Anhui Shenjian New Materials	2010	Xuchang Yuandong Drive Shaft	2010
Hanwang Technology Co Ltd	2010	Zibo Qixiang Tengda Chem Co	2010
Shanxi Tond Chemical Co Ltd	2010	Glodon Software Co Ltd	2010
Befar Group Co Ltd	2010	Shenzhen Aisidi Co Ltd	2010
Qianjiang Yongan Pharm Co Ltd	2010	Fujian Sunnada Commun Co Ltd	2010
Shandong Longji Mach Co Ltd	2010	Rainbow Department Store Co	2010
Sichuan Danfu Compressor Co	2010	Zhongyuan Special Steel Co Ltd	2010
Beijing Sevenstar Electro Co	2010	Kaiser(China)Hldg Co Ltd	2010
Zhejiang Yatai Pharma Co Ltd	2010	Andon Health Co Ltd	2010
Shandong Lipeng Co Ltd	2010	Zhejiang Wanliyang	2010
Zhejiang Weixing New Bldg Co	2010	Fujian Star Net Communication	2010
Hubei Guochuang Hi-tech	2010	Harbin Gloria Pharm Co Ltd	2010
Shandong New Beiyang Info tech	2010	Jiangsu Shentong Valve Co Ltd	2010
Zhejiang Yasha Decoration Co	2010	Qinhuangdao Tianye Tolian	2010
Guangdong Sky Dragon Printing	2010	Jiangsu Tongding Optic-Electn	2010
Chongqing Water Group Co Ltd	2010	Yotrio Group Co Ltd	2010
Chongyi Zhangyuan Tungsten Co	2010	Zhejiang Jingu Co Ltd	2010

Company	Year	Company	Year
Anhui Honglu Steel Constr	2011	Suzhou Yangtze New Materials	2012
Anhui Sierte Fertilizer Ind Co	2011	Beijing Philisense Tech Co Ltd	2012
Jiangsu Asia-Pacific Light	2011	SJEC Corp	2012
Shindoo Chem-Ind Co Ltd	2011	Shenzhen Mason Tech Co Ltd	2012
Sinovel Wind Group Co Ltd	2011	Beijing Leadman Biochemistry	2012
Shenzhen Dvision Video Commun	2011	Bringspring Science&Tech Co	2012
GCI Science & Tech Co Ltd	2011	Shandong Gettop Acoustic Co	2012
Guangdong Vanward New Elec Co	2011	Shantou Dongfeng Printing Co	2012
Hand Enterprise Solutions Co	2011	Jishi Media Co Ltd	2012
Shanghai Tofflon Science&Tech	2011	Universal Scientific	2012
Qingdao East Steel Tower Stock	2011	Sinodata Co Ltd	2012
Guangdong Hongteo Accurate	2011	Jiangsu Zhongtai Bridge Steel	2012
SF Diamond Co Ltd	2011	Kemen Noodle Mnfr Co Ltd	2012
Shenzhen Tempus Global Travel	2011	Xin Zhi Motor Co Ltd	2012
Changzhou Xingyu Automotive	2011	Pubang Landscape Architecture	2012
Shanghai Guangdian Elec Grp Co	2011	Fuchun Communications Co Ltd	2012
Huafon Microfibre (Shanghai)	2011	Jiangsu Yunyi Electric Co Ltd	2012
Zhejiang Jolly Pharm Co Ltd	2011	Toyou Feiji Electronics Co Ltd	2012
Baoding Heavy Industry Co Ltd	2011	Beijing Shouhang Resources	2012
China Oil HBP Science&Tech Co	2011	Hangzhou Everfine Photo-E-Info	2012
Shenzhen Glory Medical Co Ltd	2011	Shandong Zhongji Electrical	2012
Anhui Huilong Agricultural	2011	GuangDong HuaSheng Electrical	2012
Sanjiang Shopping Club Co Ltd	2011	Beijing Cuiwei Tower Co Ltd	2012
Guangdong Dahuanong Animal	2011	Zhejiang Jingsheng Mechanical	2012
Tongyu Heavy Industry Co Ltd	2011	Epoxy Base Electn Material	2012
Xiamen Meiya Pico Info Co Ltd	2011	Jiangsu Dewei Advanced	2012
Shenzhen Techand Ecology&Envi	2011	Bros Eastern Co Ltd	2012
Staidson (Beijing) Biopharm Co	2011	Jiangmen Kanhoo Ind Co Ltd	2012
Jiangsu Tongda Power Tech Co	2011	Jinzhou New China Dragon	2012
Jiangsu Yitong High-tech Co	2011		
Tongkun Group Co Ltd	2011		
Luoyang North Glass Tech Co	2011		